

STUDENT AND FAMILY RELATED VARIABLES IN LEARNING
MATHEMATICS AND THEIR IMPACT ON ACHIEVEMENT OF
NATURAL SCIENCE PREPARATORY SCHOOL STUDENTS.

BY
TADELE TEKETEL

A THESIS SUBMITTED TO
THE DEPARTEMENT OF SCIENCE AND MATHEMATICS
EDUCATION PRESENTED IN THE PARTIAL FULFILLEMENTS
OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF
MATHEMATICS EDUCATION.

ADDIS ABABA UNIVERSITY COLLEGE OF EDUCATION
AND BEHAVIORAL STUDIES, ADDIS ABABA, ETHIOPIA
OCTOBER, 2014

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

This is to certify that Thesis prepared by Tadele Teketel, entitled:

Student and Family related Variables in Learning Mathematics and Their Impact on Achievement of Natural Science Preparatory School Students and Submitted in the Partial Fulfillment of the requirement for the Degree of Master of Mathematics Education Complies with the regulations of the University and meets the accepted standard with the respect to originality and quality

Signed By The Examining Committee:

_____	_____	_____
Chair of Department or Graduate Program Coordinator	Date	Signature

<u>Mulugeta A. (Ph.D)</u> _____	_____	_____
Advisor	Date	Signature

<u>Mekbib A. (Ph.D)</u> _____	_____	_____
External Examiner	Date	Signature

<u>Kassa M. (Ph.D)</u> _____	_____	_____
Internal Examiner	Date	Signature

ACKNOWLEDGEMENT

I am very much grateful and express my sincere gratitude to my Advisor Dr. Mulugta Atnafu, for his unreserved encouragement, moral and professional support and also constructive advice, to make my thesis complete success in Addis Ababa University in the Department of Science and Mathematics Education and Behavioral Studies.

I would like to this opportunity to my express my heartfelt thanks to those school directors, Lemma and Gadisse from Holeta preparatory school. Tizazu from Sululta preparatory school, Berhanu and Legessa from Burayu preparatory school and Muse from Sandafa preparatory school and all mathematics teachers in the above preparatory schools besides to department heads. And all the participants' special students cooperation's during in the data collection period.

The last but not the least my deepest appreciation and gratitude goes for my lovely wife Frehiwot Senbeto and her Supporting and encouraging me at every side and edit and write the document. And SileseYitibrak from Leseto Embassy in Ethiopia too, and Hana Kebede and Berhahu Eshete from Addis Ababa Mekane Yesus Synodos for their financial and materials support and some editing also by Berhanu Malore. Finally my brother AdaneTeketel, and all my Sisters and Brothers put their effort and inclusively supports from my Father Teketel Lintale and my Mother Aberesh Sebiro (from Agewu land) throughout my study.

TABLE OF CONTENTS

PAGE

ACKNOWLEDGEMENT	iv
TABLE OF CONTENTS	v
LIST OF ACRONYMS AND ABBREVIATION	viii
ABSTRACT	ix
LIST OF TABLES.....	x
CHAPTER ONE.....	1
1. INTRODUCTION	1
1.1. BACKGROUND OF THE STUDY	1
1.2. PROBLEM STATEMENT	6
1.3. OBJECTIVES OF THE STUDY	7
1.4. RESEARCH QUESTIONS.....	8
1.5. SIGNIFICANCE OF THE STUDY	8
1.6. DILIMITATION OF THE STUDY	9
1.7. LIMITATIONS OF THE STUDY	9
1.8. ORGANIZATION OF THE STUDY.....	10
1.9. OPERATIONAL DEFINITIONS.....	10
CHAPTER TWO.....	12
2. REVIEW OF RELATED LITERATURE	12
2.1. MATHEMATICS ACHIEVEMENT.....	12
2.1.1 DEFINITION OF ACHIEVEMENT	12
2.1.2 SEX DIFFERENCE IN MATHEMATICS	14
2.2. STUDENT LEARNING STYLE IN MATHEMATICS	15
2.3. STUDENT ANXIETY OF LEARNING MATHEMATICS	22
2.4. STUDENT MOTIVATION IN LEARNING MATHEMATICS.....	24
2.5. STUDENT ATTITUDE OF LEARNING MATHEMATICS.....	27
2.6. THE RELATIONSHIP BETWEEN ATTITUDE TOWARDS MATHEMATICS AND ACHIEVEMENT IN MATHEMATICS.....	31
2.7. STUDENT FAMILY BACKGROUND RELATED VARIABLES.....	32
2.8. FACTORS THAT INFLUENCE STUDENT AND FAMILY RELATED VARIABLE AND STUDENT MATHEMATICS ACHIEVEMENT	33
CHAPTER THREE.....	35
3. RESEARCH METHODOLOGY AND DESIGN	35
3.1. INTRODUCTION	35
3.2. RESEARCH DESIGN.....	35
3.3. METHOD OF THE STUDY	36

3.4. POPULATION SAMPLING TECHNIQUES	37
3.4.1. STUDY AREA	39
3.4.2. STUDY PARTICIPANTS	40
3.5. TOOLS FOR DATA COLLECTION	41
3.6. DATA COLECTION PROCEDURES	40
3.7.VALIDITYAND RELIABILITY OF THE INSTRUMENT	44
3.8. METHODS OF DATA ANALYSIS.....	46
CHAPTER FOUR	48
4. PRESENTATION, ANALYSIS AND INTERPETATION.....	48
4.1. INTRODUCTION	48
4.2. RESPONDENET BACKGROUND BY STUDENT.....	49
4.3. ACHIEVEMENT OF STUDENT IN MATHEMATICS	52
4.4. LEARNING STYLES OF STUDENTS IN MATHEMATICS	55
4.5. STUDENT ATTITUDE, MOTIVATION AND ANXIETY IN MATHEMATICS	58
4.6. MATHEMATICS ACHIEVEMENT ,LEARNING STYLE ANXIETY ,MOTIVATION AND ATTITUDE INTERMS OF SEX,ACHIEVERS LEVEL,RADE,SCHOOL,AND FAMILY BACKGROUND.	61
4.7. RELATION SHIPBETWEEN STUDENT MATHEMATICS ACHIEVEMENT AND THEIR RELATED VARIABLES.....	102
4.8. IMPACT OF LEARNING STYLE ,ANXIETY,MOTIVATION AND ATTITUDE IN MATHEMATICS ACHIEVEMENT	105
CHAPTER FIVE.....	112
5.INTRODUCTION	112
5.1. SUMMARY ,CONCLUSION AND RECOMMENDATIONS.....	112
5.2. SUMMARY OF THE STUDY	112
5.3. THE MAJOR FINDINGS OF THE STUDY	113
5.4. CONCLUSION	114
5.4. RESULTS AND RECOMMENDATIONS.....	115
APPENDIX A	117
APPENDIX B.....	122
APPENDED TABLE 1A	130
APPENDED TABLE 2A.....	130
APPENDIX D	136
APPENDIX E	136
APPENDED TABLE	141
REFERENCE	

List of Acronyms and Abbreviations

TIMSS: The Trends in International Mathematics.

ATM: Attitude of student towards Mathematics

NSPSS: Natural Science Preparatory School Students

FDRE: Federal Democratic Of Ethiopia.

MGHAMA: Major General Haylelom Ar'aya Military Academic

IER: Institute *of Educational Research*.

GSEC: General Secondary Education Certificate

TVET: Technical Vocational Education and Training College

ABSTRACT

The purpose of this study is to investigate students' mathematics achievement and related variables that influence or enhance in the special zone of Oromia at preparatory school. And to examine the prevailing challenges that restrict them to use their own preferences of attitude, anxiety, motivation and learning style variables. The study was intended to highlight a number of influences and significance of mathematics in the zone surrounding Addis Ababa. To this end, this study is believed to contribute a lot in addressing variables which related to students and their family in mathematics achievement, provide feedback to the concerned government bodies to help them improve learning of mathematics at preparatory schools. It is also to reduce the bias or prejudice in mathematics by assisting students to use their own preferred learning styles and attitude, motivation and anxiety. This study was conducted from four preparatory schools. A quantitative method that was descriptive and employed in the study used the instruments like questionnaires and achievement test. The sample comprised of 308 (M=204, F=104) students and 221 and 87 from grade 11 and 12 were selected randomly. Statistical tools were used for final analysis. It shows participant's responses and acceptance and family related variables like family size, income and family education towards mathematics. So, it is advisable to treat the variables for better achievement and play a maximum role. The significant difference between student attitude with sex and achievement is ($p=.004$) and 83%. Anxiety and confidence among achievers is ($p=0.038$ and $p=0.010$). Dependent learning style and grade is $p=.022$ and motivation in mathematics. And family education and visual learning style is significant. There are difference in sex and high income family student and educated family in their achievement. To overcome the influences my suggestions: use the collaborative learning style since female are better. Exercise solved problems in mathematics. Give continuous training to teachers and encouraging student class participation and teachers act like facilitator. The overall achievement scores of the participants were found to be less than the promotion policy cut off 50% as per the country. 51.62% of the student is below the promotion policy score. But the over all average is above standard boundary average relative to $M=50.52$. Because of the finding, educators should be aware of student's attitudes and seek to improve them in order to positively influence student academic achievement.

LISTS OF TABLES

Table

- Table 1:** Frequency and Percentage of the participants in terms of sex, grade level, school and achievers level.
- Table 2.** Number of Respondents back ground by family Characteristics like Family education, Family income and family Size and their Percentage.
- Table 3.** The Descriptive Statistics and one sample t-test for natural science student achievement score
- Table 4.** The Descriptive Statistics on learning styles and its components variables of the study.
- Table 5.** Mean and Standard Deviation of Attitude, Motivation and Anxiety.
- Table 6.** Achievement of the student with respect to Sex.
- Table 7.** The Learning Style and its Components with respect to sex
- Table 8.** The descriptive statistics result and the independent significance difference between Attitude and its component, Anxiety and motivation with respect to Sex.
- Table 9.** The descriptive Statistics and one –way ANOVA result on mathematics achievement with respect to achievers level.
- Table 10.** Tukey test for paired achievers levels of mathematics student achievement.
- Table 11.** Descriptive statistics value in learning style with respect to achievers level and an F-test results shows their significance.
- Table 12.** Significance difference on descriptive statistics and a one way ANOVA results with respect to the achievers level on Attitude, anxiety and motivation.
- Table 13.** Tukey Test for the parried achievers level of mathematics in anxiety and confidence of students in Mathematics
- Table 14.** Presents mean and Standard deviation of the student learning style and its component with respect to grade level.
- Table 15.** Presents about the descriptive statistics and the independent sample t-test on student attitude and anxiety, motivation.
- Table 16.** Achievement with respect to school difference on descriptive statistics and a one way ANOVA result in student score.
- Table 17.** Tukey Test for the parried school types significance of mathematics.
- Table 18.** A One –Way ANOVA results on different type of learning styles and its combined effect and their descriptive statistical values and descriptive statistics.

- Table 19.** Descriptive Statistics and one way ANOVA result on student attitude and its component, anxiety and motivation in various schools.
- Table 20.** Tukey Test for the school type on the motivation of the student in mathematics.
- Table 21.** Descriptive statistics result and an F-test result difference on student achievement.
- Table 22.** Descriptive statistics and one way ANOVA test result on family size and learning style components.
- Table 23.** Descriptive statistics on student related variable and the one way ANOVA result on family size of the student.
- Table 24.** Descriptive statistics and a one way ANOVA Results on student achievement with family education.
- Table 25.** Descriptive Statistics and one way ANOVA results on family education and student Learning style.
- Table 26.** Tukey HSD test for the paired educational levels of mathematics at preparatory levels with student Visual learning style.
- Table 27.** One –way ANOVA result on descriptive statistics of the student attitude, anxiety and motivation with respect to family education.
- Table 28.** Shows that a one –way ANOVA test result and descriptive statistics on student achievement difference in family income.
- Table 29.** Descriptive Statistics and one way–ANOVA result on learning style and its component to the student family income.
- Table 30.** Descriptive statistics result and a one way ANOVA output on student attitude, anxiety and motivation.
- Table 31 .**Pearson Correlations on the components of learning styles, attitude and anxiety and motivation on students achievement.
- Table 32.** ANOVA table that shows collective impact of learning style, attitude, anxiety and motivation in mathematics achievement.
- Table33.** Collective impact of Learning style, attitude, anxiety and motivation on mathematics achievement in ANOVA table.
- Table 34.** The t-table shows un-standardized and standardized regression coefficient for ten independent variables and individual impact of the variables.

CHAPTER ONE

Introduction

The study is organized into five consecutive chapters. It starts from chapter one which is the introductory area of the study and it consists of background, purpose, research questions, objective, significance, limitations and delimitation of the study. And under chapter two the review literature parts of the study is treated. Chapter three is all about the methodology part of the study and research design and it includes different variable and its components, questionnaires and table of specification from achievement test, validity and reliability under the guidance and supportive comments from my advisor. The data analysis and interpretations part is discussed in chapter four. The last chapter is devoted for Summary, recommendations and conclusions of the study.

1.1. Background of the study

In Ethiopia, One of the objectives of FDRE education policy is to enhance student's academic capacity (MOE, 1994) and to improve the quality of secondary education and to increase access and equity. Here in the study as a beginner researcher I concern to investigate the level of student in mathematics achievement test at preparatory schools. The role of education and training policy in our country education system equips student with pedagogical skill, ability and values in different subject. So the selected variable interacts to this element. By using their skill and equipping student how to encounter societal barrier. Educational research states that establishing proper foundation and has to be laid for further study and the country development strategy. It support for economic reform program and it will be contribute for development and Social Corporation. The World Bank and International Monetary Fund (IMF) state that education quality and built series structural adjustments programs work for these excellence. Ethiopia has recently designed a strategy through which 70% of the university enrollment would be in Science and Technology from these schools .This scenario has created by a unique and

challenging situation where by Science and Mathematics (S & M) secondary education is put to the spotlight. Cited by (Eshetu Asefa, Dilamo Otores, Tesfaye Ayele, and Zinabu Gebremariam , Jan-Feb 2009).

Since the issuance of the Education and Training Policy (ETP) in 1994, accompanied with educational sector development programmers, efforts have been made to improve higher education in quality and accessibility. Those students join higher institution from preparatory school grade student enrolment has increased. Mathematics is one of the basic subject and its important areas has not previously played the intentioned a role. Mathematics considered as field, as a course in education discipline of thoughts and for logical reasoning. To achieve those instructional elements different techniques are basically required. Education is a process by which man transmits his/her learning experiences, new findings and recent, innovative values in societal development due to education as a tool. In education, learning mathematics is very important. Thus mathematics subject which supports to upgrade individual analytical thinking capacity across generations all over the world. Currently, Ethiopian government gives attention to Science and Mathematics education is not exceptional of our country, but also supported by Wain, (1994).

It is a discipline that focuses in the advancement of student's mathematical skills and proficiency. The development concerns of arithmetical thinking, logical reasoning, and overcoming challenges in learning mathematics and encourages creativity as stipulated in strategic document. There have been a significant in the mean mathematics achievement of the Maori students as measured by the international bench mark (MOE, 1996) cited by Mariylen Taylor. Teaching Mathematics is much like building of house (Glucly 1995) as cited in Bayram (2005). It is also important to know how student learn mathematics. He also discuss that student needs to learn mathematics concept for better achievement.

Student learning which coincides to the role of instructional approach that employ during learning mathematics might have high contribution on student's academic achievement and understanding the subject matter. In Oromia region surrounding the capital city of

Ethiopia, which is Addis Ababa, there are the Holeta, Burayu, Sululita, and Sandafaa governmental preparatory schools in the zone under the MOE. However these schools, Holeta secondary and preparatory school pass decades of years. All of them deliver education for community children and give training for learners. But all the school is not special school in the region rather than legal binding school under the Ministry of education to deliver education.

Mathematics abilities took the right place and perform more important role in today's society with increase demands for mathematically literate workers to meet economic needs (NCTM, 1990, 1998). Therefore, to turn out mathematically literate works, schools must meet these demands by placing a higher priority in mathematics. Therefore, these schools promote their training service to functioning academic and administrative sections in order to fulfill their missions to ensure a mathematics education of the highest quality for all students.

Every schools and there respective sections work for the learner's excellence and development. Even though the schools are such big institution that requires modern mathematics education in order to meet their objective effectively and efficiently .Thus, in this study I have only focus natural science preparatory school students as a sample participant /or population that are assigned in both grades. Here there are different independent variables like attitude, motivation, anxiety and learning style of student in learning mathematics and their achievement.

So learning is a routine exercise special at the schools. Student's learning systematically and scientifically assesses the strength or limitations and developments needs of existing mathematics achievements, which accredit school efforts. Mathematics teachers need to develop their practices and evidently to fit more closely with the roles, examine the student functions and identify their student's strength for better improvement. Teachers need to match their teach mathematics to students in preferable learning styles to win or over come all the variables or characteristics which relates to mathematics learning and family related characteristics.

Dunn (1995) states that learning styles in mathematics and the way of delivering the concepts by the teacher are not connected appropriately. It indicates and causes to student anxiety and may kill their interest for further study and continued mathematics education development. Some students are not necessarily good at learning mathematics in school by using different learning styles inclusively motivation and attitudes, more over their anxiety in their effectiveness of achievement in mathematics. Moreover Anxiety in teaching mathematics is one of the factors that affect the attitude in learning in mathematics.

From my past 12 years teaching experiences as mathematics teacher the mentioned variables relates to students mathematics achievement. The may relates to their learning Styles in different schools or institutions are not satisfactory for better achievement. From my observation as hypothesis students learning styles for better achievement seeks to overcome the indicated factors. In this study few students are good in dependent learning styles, others good in collaborative learning styles, and others are good at independent learning styles and majorities are good at auditory learning styles. May some of them are good in all types of learning styles. Since individuals learn in different way.

Different students consider Mathematics as one of the most difficult subjects when they compare to the other subject and this might be the option for their frustration /anxiety and less motivated in learning Mathematics. So some of them have over ambitions and not motivated on Mathematics class room when they learn Mathematics. These attitudes or feeling hinder students not to use their own talents to learning Mathematics and they do not try to apply their efforts for best achievement. Some of student's may attend the class for the sake of class promotion but not for further study as a field. This may require a solution and the researcher forwarding probably the convenient findings on variables and mentioned in the above indicated characteristics and influences in their mathematics achievement.

The researcher is seeking to search justifiable solution to over challenges of student achievement. Due to my practical experiences and theoretical feedback and the supportive investigations shows the preferable learning styles of natural science students at preparatory class. And they achieve not badly and results compare to other subject's students should have also good knowledge or strong background in mathematics is more preferable. Doolan and Honigsfeld (2000) state that when students are taught, they do not succeed in mastering the subject matter as quickly as they could have. Honigsfeld (2000) discuss students mastering the subject as much as quickly mover students and are expected to construct their own mathematics knowledge on their own learning style rather than memorizing mathematical formulas & procedures. Various scholars are interested to deal with the negative effective of mathematics anxiety and students mathematics achievement.

In Ethiopia the first mathematics curriculum guide that include list of Book for secondary schools was developed by MOE, 1956 and HIU, 1967 and the introduction of a new education policy since the fall down the previous regime, arrangement is changed to consist of two level .Now a days this school is divided in to two stream namely high school and preparatory. In both level mathematics is still one of the compulsory subjects. Whatever the historical development of learning mathematics as a subject in our country was took a time and we should be aware of the wide range of importance influence on our everyday life and also learning mathematics is important for the advancement of science & technology and for better understanding of the world or universe. In this connection its works **Brown & Pork (1996)** in their work indicated that science and technology support modern society, moreover it is an indirect use of individuals in strengthening their powers of reasoning so the usefulness of Mathematics can further be considered when thinking of future career. Few students enjoy when they learn Mathematics and try to upgrade their confidence to learn the subject. So scholars and educational intellectuals like **Arton and Wain (1994)** forward their view about mathematics activity and claiming that mathematics has been a way of meaningless activity. Not only these scholars viewed in such away that but also in our country (ICDR, 1998) state that secondary school students had a negative attitude towards learning

Mathematics. This may correlates with their academic achievement in Mathematics and hindrance of the student's interest for learning among different students.

1.2. Statement of the problem

Mathematics is one of the compulsory subjects given almost all levels of education. As it is basic skill, it has to be taught and learnt well. In our preparatory schools, students' achievement in mathematics is not good as compared to others .A number of variables can be seen in line with why achievement in mathematics is low. Some of them are: Student related variables like anxiety, motivation to learn, their attitude in terms of (confidence, enjoyment, and usefulness) towards mathematics and learning style in terms of (Auditory, Collaborative, Visual, Independent and Dependent) they employ for their learning. The other is family related variable .For instance, income, family size and family educational background. Here the Study focus natural science preparatory school students were admitted during the academic year of 2006 E.C in the special zone. They have studied at least for two years to take GSEC as encoding to strategies of education and training policy of FDRE (1994).The major responsibility and duty of mathematics teachers as much as possible to train and produce the talented students in mathematics. The successes of the student can be determined and highly dependent on skill, knowledge and ability of the learners. I am able to realize that natural science preparatory school students and technical vocational education training College student have learning difficulty in mathematics. As a researcher let's decide to have discussion outside on their school task and request noticed. It was really useful to do this because they need help to think things wider sense. So, lets try to identify the convenient learning style in mathematics and as depicted in (2003) National Assessment of Educational Progress Mathematics Assessment (National Center for Educational Statistics, 2003 document) indicates problems of learning mathematics and student's achievement and knowledge and previous experience predicts of future success. To minimize the degree of influence on student achievement let investigate levels of impact in this research.

- ❖ All the above mentioned variables may relates to the existing negative perceptions, insufficient materials, school facilities, teacher’s preparations, students’ academic background ...etc. But these will be leaved for future researchers if necessary and documents from MOE mainly focus to minimize learning difficulty in mathematics. This study tries to assess variables that influence student achievement in mathematics and why students face such kind of challenges. Since mathematics is the core of all other discipline in education, so the researcher believes that series attention should be required by mathematics to improve mathematics achievement of natural science student. Furthermore from my observation most students do not have understanding the basic structure of mathematics. And they have difficulty and internal worry and frustration in mathematics (anxiety) and relatively their motivation and student’s attitude with different components in learning mathematics and their family background character.

1.3.Objective of the study

The general objective of this study is to investigate student’s related variables and family related variables and their impact on natural science student at preparatory school level in mathematics achievements and learning mathematics from the special zone of Oromia region surrounding Addis Ababa. Specifically, the objectives of the study include the followings:

1. To determine the natural science preparatory schools students’ status in mathematics achievements it coincides to the Ethiopia education 50% promotion policy at grade 11 and 12.
2. To identify the students level at different types of learning styles, student attitude, anxiety and motivation of natural science preparatory schools student.
3. To analyze the significant difference between mathematics achievement and learning styles (auditory, collaborative, independent, visual, dependent), anxiety, motivation and attitude (enjoyment, confidence and usefulness) with respect to sex, family background (family size, family income and family education), grade level, school and achievers levels.

4. To identify the relationship among natural science preparatory school student's mathematics achievement and student's related variables like Learning styles, attitude, anxiety and motivation.
5. To investigate the impact of the students related variables to student mathematics achievement of the natural science preparatory school students.

1.4. Research Questions

By considering the above objective the researcher sought to answer the following research questions.

1. What is the level of achievement of natural science preparatory school student compared with 50% cut off score promotion policy?
2. What are the levels of learning styles of the natural science students in Mathematics?
3. What are the levels of the natural science students of anxiety, motivation, and attitude in Mathematics?
4. Is there any significant difference of the natural science preparatory student's mathematics achievement and learning styles, anxiety, motivation and attitude with respect to sex, family background in terms of (income, family education and size), achievers level, grade level and School?
5. Is there any significant relationship between natural science preparatory student's mathematics achievement with learning style, anxiety, motivation & attitude?
6. Is there any significant impact (negative or positive) of the variables learning styles, anxiety, motivation and attitude of students on mathematics achievement?

1.5. Significance of the study

This study will have at least the following significances:

1. Identify the factors of learning mathematics of natural science student at preparatory school in the special zone of Oromia and forward there justification.

2. The result of this study is used as an indicator to show the direction for the concerned bodies from the schools, student's characters at preparatory school and those who need to study further mathematics education.
3. It encourages the Oromia region of special zone education Bureau to take initiatives to devise appropriate measures to minimize the student's related variables which relates to them and their family background of learning mathematics.
4. The findings of the this research will be useful to any researchers who have interested on the further study of student related variables on this study minimizes learners bias on their math's anxiety, attitude and learning styles towards mathematics.
5. It serves as a starting point for further researchers in the area of natural science preparatory school students related challenges like, attitudes (enjoyment, confidence & usefulness) and motivation, anxiety and learning styles (like, auditory, visual, collaborative, independent and dependent) and characteristics which relates to their family status on that achievement.

1.6. Delimitation of the study

The study is delimited conceptually to achievement, attitudes, Motivation, anxiety and learning styles of mathematics in grade 11 and 12 natural science student in special zone of Oromia region to governmental preparatory school. The participant of the study is those Natural science preparatory school students in the zone and it is focused for the purpose of uniformity and manageability of the whole study. Thus, the sum-up part will be confined only for the above mentioned schools population.

1.7.Limitations of the study

There are some limitations during the study period. Some of the student not properly responds on the requested questionnaires. The areas were the participant's live and researcher enriching. The sampling procedures employed at the beginning. Some of them

not return back questionnaire the paper on time. Some of the student not gives answers in the achievement test properly. Few numbers of students were not voluntary to give exact figure of their family monthly income. Thus, the selected variables as a beginner researcher they are psychological difficulty for generalization. Almost all the variables are psychological terms and the statement is also get supportive comment from my External Examiner Mekbib A. (Ph.D) lecturer in Addis Ababa University. The selected variable like anxiety and motivation can not be determined only on the requested items.

1.8. Organization of the study

This research paper consist five chapters and all the consecutive chapter interlock with the mentioned variable impact description on student achievement. Chapters One: Consists of the introduction part of the study, Background of the study, statement of the problem, objectives of the study, research questions of the study, significance of the study, limitations & delimitations of the study, organization of the study. Chapter two is all about related literature review that I substantiated the respective titles by the theoretical framework. Chapter three: it devoted to the research design and methodology that implemented in the study and the data analysis: Chapter four: looks about the presentation, analysis, interpretation, and discussion, of the gathered data and under Chapter five: summery conclusions & recommendation of the study will be discussed.

1.9.Operational Definitions

For the details discussion in this study the following term and concepts are defined accordingly and some of them are supported by some other scholars.

Achievement test: A test, typically standardized, which is designed to measure subject and grade-level specific knowledge. Achievement tests are frequently used as a way to determine at what level a student is performing in subjects. The test determines their scores on a test constructed by the investigator from standardized test in mathematics.

Students' attitudes: The attitude construct is widely used by teachers and researchers in mathematics education focuses here. May negative attitude' is a causal attribution of students' failure, perceived as global and uncontrollable, rather than an accurate interpretation of students' behavior, capable of steering future action and useful for dealing with students' difficulties in mathematics. Moreover, tendency of the students to respond favorable or unfavorable on the usefulness of mathematics and the enjoyment in learning in learning mathematics.

Achievers level: A student's current attained their score above 80% is high achiever and those below 50% is low achiever whereas all the rest are medium achievers according to our education policy this is supported by Asefa Enno (2004) cited by Eyasu Gemechu 2012 also states that this range of achievers level.

Motivation is defined as an internal state that arouses, directs, and maintains behavior motivation is a reason of students' thinking in a given situation.

Anxiety is state of uneasiness or tension caused by apprehension of possible future misfortune, danger, and worry. **Anxiety** is an unpleasant state of inner turmoil, offend accompanied by nervous behavior, such as pacing back and forth.

Learning style: is an individual mode of gaining knowledge, especially preferred or best method .Learning style is an individual's unique approach to learning based on strengths, weaknesses, and preferences. Learning styles group common ways that people learn. Everyone has a mix types of learning styles, some people may find that they have dominate style on one learning approaches , with for less use of the other styles, the others may find that they use different styles in different circumstances'.

Attitude: is the tendency of students to respond favorable or unfavorable towards the usefulness of mathematics and their enjoyment and confidence in learning mathematics.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2. Introduction

In this chapter the concept of learning style and its component, attitude and its component, anxiety and motivation is emphasized. The general objective of the study is to investigate the mathematics achievement of natural science preparatory school student with their related variables and family related characteristics in some selected preparatory schools. These schools are selected from the special zone of Oromia region surrounding Addis Ababa. So, the researchers focus on different issues. Under each chapter there are attempt to made discussion on student's related variables & family related variables in terms of family income, family size and family education status. The issues related to the students mathematics achievement and the selected variables. In my pinion the variables have great influence in mathematics achievement and learning mathematics. Besides to this description let's try to identify the overall solutions for better achievement. The issue of student is not successful achieving the expected level in mathematics and state basic learning styles and student's beliefs that acquire basic guide lines. So, in this chapter let us treat all the research literature review that support analysis with the national and international scholar's view. And brief clarification on each subtitle. Here the entire topic contains the sum-up element for the main body of the research.

2.1 Mathematics achievement

2.1.1 Definitions of achievement

Achievement test is predicting on individual future direction. It measures the individual capacity where he/she will attain. Here in the measuring all the students' related variables in the school's performance and by using the achievement test were given .According to Jones (1981) states that some literatures looks achievement test as home work, term papers, exam & quizzes etc... to evaluate the academic efficiency on their students. Anastasia (2011) state that achievement test must be well constructed and typed for

learner to measure their level to standardized learner's outlook. These determine mathematics achievement varies systematically from students to students and school to school: to what extent the Learning of mathematics with the related variables. To what extent student's sex and location account for their difference in mathematics achievement at the scores levels.

- I. To what levels of the learning style, level of the scores 50% promotion policy cut off mark, and level of natural science student's anxiety, motivation and attitude in learning Mathematics.
- II. To what extent their significance difference of students achievement & learning style, anxiety, motivation, and attitude towards mathematics.
- III. Is any significant relationship between student achievement with family background (family size, family education and family income) and student's related variables?

Types of Achievement test

Achievement tests are classified in various approaches and Standardized and class room teacher built achievement test and it is also over the bold distinction. According to Om P.Ahuja (2005) discussion that Standardized test measure student achievement level and teachers have got feedback about student level in the world class society. From the World Bank (1993) document it is used as they set average level of efficiency on their academic achievement. Standardize tests usually are developed by experts and are designed for use in the school. In few literature achievement test are listed like home work, term papers, exam & quizzes etc. to evaluate the academic efficiency on their students.

❖ Mathematics achievement

The dependent out comes measures in this study was the mathematics achievement test developed by the experts in National Educational ,Assessment and Evaluation Agency for the expected University entrant grade 12 students. The test contains 23 multiple choice for grade 12 and 32 multiple choice for grade 11 from their text book considerations on table of specification and different constructed items. The achievement

test in mathematics for the assessment was designed as a table of specification for the address knowledge, comprehensive, application and analysis type questions.

❖ **Student's characteristics**

Major student's related characteristics/variable known to influence Mathematics achievement namely, attitude, Motivation, anxiety and learning styles. Were included in the students background questionnaires similarly sex and location were the basic stratification variables in the sample.

❖ **Student's family background**

This questionnaire includes information from student's family background (income, family size, and family education). The questionnaires comprised different items to assess the above variables and to do well in mathematics. For many minority and lower-income students, it has been shown that family backgrounds can significantly impact a student's scientific and mathematical achievement and Students related and family background factors/variables on student's mathematics achievements. Perhaps the single most influential predictor of achievement and participation in mathematics is the level of education parents attain. Those most likely to go on to college or to graduate school are those whose parents attended college or graduate school themselves. An attitude is an internal disposition to evaluate in positive or negative in terms of given objective which is accompanied by affective, cognitive and behavior respondents (Aiken, 1992). The attitude construct is widely used by teachers and researchers in mathematics education. Negative attitude' is a causal attribution of students' failure, perceived as global and uncontrollable, rather than an accurate interpretation of students' behavior, capable of steering future action and useful for dealing with students' difficulties in mathematics.

2.1.2 Sex differences in mathematics education

❖ Differences and similarities on sex and mathematics achievement

Various scholars on their research statement reflect and discuss the complexity of the causation of sex difference in student's mathematics achievement. For instance one of the scholars we call Fennema (1995) statement, this difference make a gap or score variation

on student achievement. Her detail discussion focus genetically as well as biologically difference makes a gap on student academic achievement. These differences criterion was often used to indicate that while the behaviour of concern was clearly related to the sex in subject matter achievement.

❖ **Factors influencing mathematics achievement**

Various researchers indicate family structure and sex, family education status and family income is related factors on student achievement. These all are inclusive with student attitude and environmental problems and parent involvement (Campbell et al. 2000; Fennema & Sherman, (1978). Three factors or predictors in math achievement are divided into sub-factors: According to Akdemir (2012) factors related to student achievement of mathematics are demographic factors such as gender, socio-economic status, and parent's educational level, Instructional Factors such as teacher competency, instructional strategies and techniques, curriculum, school context and facilities and Individual factors like self-directed learning, arithmetic ability, and motivation. But here I have focus only the variable likes family income and family education, and motivation variable from the above and from learning here I focus on different learning style. Let us see the degree of these variables in our context and mathematics education and also student's attitude and anxiety.

2.2 Students Learning styles

2.2.1 Definitions of Learning Style

From different literatures learning is defined as a modification through experience and active process. It is also defined as the acquisition of behavior pattern. Moreover, it is the modification and coordination of the responses of the organism.

- ❖ Learning styles are points along a scale that help us to discover different forms of mental representation. Every individual learn their own preferable learning style.
- ❖ It is not a passive observation of knowledge and gambling more reading of books.

Those students at preparatory level joined and I met them with questionnaires in different school have their own learning style. One individual is best at one learning style and the other also best on other learning style. It is strengthened by Mary Lynn Wilson indicates that there is wide acceptance of the concept of learning styles and academic achievement. Thus, there is even a studying providing style. However, there is a disagreement on how the best measure learning style Hall (2008) cited by Xin Ma (2014). It implies that there is no one best style of learning. Even if it is true let us search the best style for mathematics student learning and their achievement. Individual have got knowledge when learn mathematics and show progress in his/her enrichment learning experience. So learning mathematics be understood as learning and there is an interaction of the environment with the organism. Learning occupies an important place in the school. Without learning all efforts of student as well as of teachers are purposeless. Learning especially consists in the modification of reactions due to practice. Different ideas about learning styles create distinct approaches to identifying the specific attitudes and skills that characterize styles and different measures designed to generalize between learning contexts and types of learner.

2.2.2 Why learning styles Differs?

According to Wang (2008) state that school reformation and developing student ability for their effectiveness. From his view every student becomes an active learner and learners by them self carry responsibility for acquiring knowledge and developing skills and in sustainable approach in pattern of self-directed and lifelong learning. Here enjoyment contributes for student achievement and education quality in different learning style. Different students are enjoyed when studying mathematics in the school. Students understanding are immediate impact on their learning mathematics. According to RamSden (1988) view of student enjoyment have a positive degree of impact on student initiation to learning and a substantial effect.

This is also supported by Posner (1979) is cited by Jhon M.Cornwell (1994) and adds his work on Kolb's learning style theory, all the constraints, facilities or subject matter

context influences what teachers and learners do and include the immediate assessment of the classroom. But it also includes the administration of the school, parent influences, governmental regulations, the background of the learners and teachers, the money available and financial capacity to education and the time for learning.

According to Junko (1998) the statement of citation from Ramsden (1988) and forward his context influences to learning, are not something a student has rather they represent what a learning task or set tasks is for the learner. For him, learning has two aspects, deep to learning (intention to understand) and surface learning (intention only to complete task requires) is responses to the educational environment. He is also stated that the educational environment or context of learning creating through student.

Let's try to change the approach and then the student but to change student's experiences, perceptions or conceptions. Thus recognizing student's perceptions of issue are great significance as the context of learning is an ever present influence on student's activities. For instance, perception have its own influences on work load of the effectiveness of teaching and the commitment of teachers, and of the amount of control students might exert over their own learning influences the development of different style, which is very clearly adaptive responses to the educational environment. From different Ramsden Literature as a teacher and intellectual views student's learning styles are influenced partly on their previous experience, the nature of student interest in the task and the knowledge they have.

Intentions to understand are closely related to a student's interest in the task for its own sake and also associated with a well-developed base of knowledge in the field of study. If there are gaps in one's understanding of basic concept, his/her attempts to understand new material will be frustrated. Learner interacts with task in the minimum requirements.

Moreover, one has to notice that we cannot train students to use deep approaches when the educational environment is giving them message own surface rewarded. In such circumstance as Ramsden, the quality of student learning can be enhanced by changing the curricula. And construct the teaching methods have taken hierarchically structured set

of beliefs, the characteristics of students, the modes of learning and the ways in which all of these interact.

In mathematics well developed theory is used as whether it can guide practice or practice is based on theory by practice, we mean that the methods and skills that apply to the working, when a person is on the job and actively involved in his or her profession Ornstein (1994). Different people learn differently. As a student you should be aware of your own learning style. There is a good in the mathematics learning center that can help you to assess your own learning styles.

2.2.3 Components of learning styles in this study

The concept of learning styles mentioned here on students achievement influences and teachers to rethink to use appropriate style to improve students' academic achievement. Zhang (2001) stated that style is not ability it is rather one's preferable way of using his/her ability and skills. Learning as a basic skill and learning styles as a way to improve learning approach of students. Campbell (2000) argues that using different mathematics learning style student learning mathematics better understanding. This also supported by researchers Guild and Garge so that the effective educational decisions and practices must derive from an understanding of the ways that individuals learn. Here the study assuring the preferable learning style for different level of student but not addressing the dominant learning styles for mathematics student to learn mathematics for understanding the way them prefer. And some student will enjoy the greater freedom of project work that encourages independent learning style.

1. Auditory Learning style:

These people learn best through hearing and benefit oral lectures and listening to others. The auditory learner remembers what they hear and say this is the strength of this style. Auditory learner enjoys class room and small group discussion, Understands information best when they hear it. So, here the perceptual element describes students whose primary learning style is listening to verbal interaction and discussion or recording. An Auditory learner depends on hearing and speaking as a main way of learning. Only 30% of the

general school age population is auditory. These learners are learners who want to listen, whatever they have to learn. They speak loudly whatever they have to learn. These learners are more successful in schools and colleges, because most of the teaching learning process depends on listening and speaking. Study with friend so they can talk about the information. When doing mathematics calculations, use grid paper to help them.

2. Visual learning styles:

Visual learner prefers to see the things in order to learn. These learners like to learn through pictures, images. They can understand different ideas while watching or seeing. Even if Learners having different learning style preferences and they would behave different way of perceiving, interact, and respond to the learning environment Junko (1998). Since learners differ in their preferences to certain learning styles, Characteristics of visual learners are seeing or writing, approximate 40% of learner's are these learners. MacCoby and Jacklin (2004) state that difference between female and male in this skill, particularly spatial visualization or the ability to visualize movements of geometric figures in one's mind. Fennema-Sherman and Fennema and Tartre (1995) states that longitudinal study investigated spatial skills or spatial visualisation had been positively correlated with mathematics achievement.

This perceptual element describes students whose primary is to read or observe material to be learned. These learners are best through seeing and visualizing object and they usually close their eyes and visually recall the information from diagrammatic or printed material. Fennema (1978) suggested that an appropriate curriculum redesign could compensate for these weak skills and Outperforming girls on tests of visual/spatial abilities than boys: to draw inferences about or to manipulate pictorial information. The male advantage in spatial abilities was reportedly not large, but detectable by middle childhood and persisted across the life span. These learners create mental pictures in their mind about those things or concepts, which they have to learn. They are interested more in pictures, and photographs than the discussions. The visual learner feels comfortable when they can see the person who is speaking.

3. Independent learning styles :

Students who like to think for themselves and are confident in learning abilities. Grasha – Reichmann (2006) states that students prefer to learn the content that they feel is important and would prefer to work alone rather than with others or peers. Mathematics scale independent learning style is one of the learning styles. Some students prefer to study alone but in close proximity to others. It is important to note that analyzing the intentioned factors in mathematics test does not only differentiate among those students who prefer learning.

Phan (2007) states the understanding (being part of reflective thinking) is related negatively with academic performance of students, whereas, critical thinking (part of reflective thinking) is positively associated with academic performance for students in the mathematics discipline. These learners prefer to work independently or alone. These learners are also feeling to good achieve goals independently. Individual projects, reading, tutorials, writing assignments, and self paced learning are those methods.

4. Collaborative learning style:

According to Davidson (1990) states when compared student achievement in small group settings with traditional whole-class instruction. In more than 40% of these studies, students in the classes using small group approaches significantly outscored students on measure performance. Studies of collaborative group-learning methods, Slavin (1990) concluded that cooperative methods were effective in improving student achievement. Different literatures Provide descriptive feedback to students about their work and to identify the strengths and weaknesses in their mathematics achievement. Opportunity to learn (OTL) was studied in the First International mathematics Study. Teachers were asked to rate the extent of student exposure to particular mathematical concepts and skills. Strong correlation was found between OTL score and average student achievement, with high OTL score associated with high achievement.

The most effective methods emphasized both group goals and individual accountability. Wood (2010) found that whole-class discussion works best when discussion and expectations are clearly understood. Students should be expected to evaluate each other's and ideas and reasoning in ways to share. Students should be expected to active listener who participate in discussion and feel a sense of responsibility for each understands. Student achievement and understanding are significantly improved when teacher are aware of how students construct knowledge. Teaching that incorporates students' intuitive solution methods can increase student learning. Nowadays the promising practice in mathematics, science, & technology in education programs work and Improving teaching and learning in science and mathematics. Illustrates how constructivist ideas can be used by science and mathematics educators for research and the further improvement of mathematics practice.

5. Dependent Learning style:

These learners look at student and classmate in order to learn mathematics. They are more of depend on others for external support. They are like in authority position give them instructions about what to do, and what to do learn. There have been various approaches in studying the nature of learning. But here the non-experimental design was used for the study. For instance the Psychologists like Thorndike, Hull and skinner have worked to find out nature of learning process. Learning as a concept is not misunderstood with other concept like motivation ...etc. Learning like growth, expands the possibilities of adaptive behavior.

Learning includes a wide variety of change in behavior or may involve the fostering of right attitudes. Motivates or drives are basic to any type of learning and to the learning process itself. Learning process involves and motivates spring up a goal of the comprehensive process. It also involves the use of abstract concepts. Learning involves various dimensions of psychological and mental activities on the effective learning, among various psychological factors, Motivation and learning abilities. And learning is a trial and error process.

2.2.4 Learning Styles and Academic Achievements

There have been various attempts made to enhance students' academic achievements. It has always been the main concern of dedicated teachers and parents that their students be successful. In relation to this, many teachers are convinced that students need the positive attitude to succeed academically. So, one's learning style is identified to determine and contribute for their strengths in academic achievement. Dunn, R (1993) studies with known direction it has been indicated that both low and average achievers earn higher scores on standardized achievement and attitude tests. When they are taught within earn of their learning styles. Cheung K.C (1988) discuss the importance of learning style and also important for individuals in academic settings.

Most students favor to learn in particular ways with each style of learning contributing to the success in retaining and what they have learnt. From the past studies carried out conclusion that students retain 10% of what they read, 26% of what they hear, 30% of what they see, 50% of what they see and hear, 70% of what they say, and 90% of what they say as they do something according to Cheung 1988. This shows student variation in learning.

2.3 Students Anxiety of learning Mathematics

2.3.1 Definition of Anxiety

Anxiety is one which is aroused by some temporary condition of the environment such as examination, accident, punishment etc. Mathematics anxiety can be defined as the general lack of comfort that someone might experience, along with the feelings of tension and anxiety that interfere with the manipulation of numbers and the solving of mathematical problems in a wide variety of life and academic situations according to Richardson & Suinn (1972). Academic anxiety is a kind of anxiety which relates to the impending danger from the environment of the academic institutions including teachers, certain subjects like Mathematics, English etc. Math anxiety defined as tense or worrisome feelings that significantly hinder mathematical performance in academic and ordinary life situations Ashcraft (1998), Richardson & Suinn (1972).

Hilton (1981) and Offetn & Kuyper (1988) states that motivation and mathematics anxiety are individuals who perceive mathematics as difficult and their ability to do mathematics as poor as the expected and its impact or influences revels on mathematics and their achievement. Math anxiety is also defined as a phenomenon that is often considered when examining students' problems in mathematics. Mark H. Ashcraft (P.hD) (2002) defines math anxiety as a feeling of tension, apprehension, or fear that interferes with math performance.

Fennema & Sherman (1976), using their mathematics attitude scales, found that math anxiety & Mathematics ability concepts were highly correlated ($r = -.89$) in sample of high school students. More over Boys express slightly more positive anxiety in learning Mathematics than do girls Aiken states that there is a gender difference and it supported by researcher Bentiz, (1978) and higher anxiety in female students than males. And also MacLod states that grade level differences in math anxiety were stronger and more relevant than gender differences. Moreover mathematics anxiety would increase over age; girls were expected to express more mathematics anxiety than boys, especially at the upper grades.

- ❖ To some extent Anxiety is not the same as fear, which is response to a real or perceived immediate threat whereas anxiety is the expectation of future threat. Anxiety is a feeling of fear, worry & uneasiness, usually generalized and unfocussed as an overreaction to situation that is only subjective seen as meaning. Anxiety is distinguished from fear, which is an appropriate cognitive and emotional response to perceived threat and is related to the sacrifice behavior of fight or flight responses .Anxiety Occurs in Situation only perceived as un controllable or un avoidable, but not realistically and David Barlow defines anxiety as a future oriented mood state in w/c one is ready or prepared to attempt to cope with upcoming negative events

2.3.2 Factors contributing the Students Mathematics Anxiety.

Mathematics anxiety is characterized by anxious responding that occurs both in the immediate context of a performance-based setting for instance math class or in anticipation of having to perform publicly being called on during math class and the

subsequent potential for negative evaluation by teachers and peers (Ashcraft 1998). Anxiety: it is aroused by some one temporary condition of the environment such as examination, accident, punishment etc.

2.3.3 Mathematics anxiety and mathematics achievement

Mathematics anxiety is an especially promising mediator of the relationship between parental involvement and children's mathematics achievement specifically because of the link between parenting practices and children's anxiety-related behavior. Vukovic, Roberts, Vukovic (2013) states that the well-documented relationship between mathematics anxiety and mathematics achievement for better achievement. Indeed, highly mathematically anxious students enjoy mathematics less, are less confident in their mathematical abilities, and, as early as middle school, steer away from mathematics courses Ashcraft (1998) and Hembree (1990).

Math anxiety measurement scale was developed by Richardson and Suinn (1972). Since this development, several researchers have examined math anxiety in empirical studies. Hembree (1990) conducted a thorough analysis of different studies concerning math anxiety. It determined that math anxiety is related to poor math performance on math achievement tests and that math anxiety is related to negative attitudes concerning math. He also suggests that math anxiety is directly connected with math avoidance.

2.4 Students Motivation in Learning Mathematics

2.4.1 Definition of Motivation

Motivation is the drive or desire of the student to engage in learning for its own sake. motivation as an orientation towards a goal. This orientation may be positive, negative or ambivalent. Motivation provides a source of energy that is responsible for why learners decide to make an effort how long they willing to sustain an activity, how hard they are going to pursue it, and how concerned they feel to the activity. Motivation is reasons individual have for behaving a given manner in a given situation. Middleton, A.J., Spanish, A.P (1999) citations from Seegers & Boekaerts. Middle motivation convincing evidence

that student effort and performing can be better explained by task specific analysis of motivation in mathematics than by general measures of motivation. Students Motivations tend to focus on learning goals such as understanding and mastery of mathematical concepts. Linn (1989) motivation found that students in high ability mathematics tracks tended to find mathematics easier, tended to enjoy doing mathematics more, and considering mathematics to be more useful than did students in lower ability tracks.

Motivation is a potential to direct behaviour that is built into the system that controls emotion. student potential be manifested by their emotion and behaviour as well as cognition by Hannula (2004) as cited by Amine B.(2012) and stated, motivations are reasons individuals have for behaving in a given manner and situation. They exist as part of one's goal structures, one's attitudes and they determine whether or not one will engage in a given pursuit.

Two distinct types of academic motivation interrelate in most academic settings-intrinsic and extrinsic motivation. Intrinsic motivation is defined as motivation to engage in a task for the sake of interest in the task itself and the inherent pleasure and satisfaction derived from the task, whereas extrinsic motivation is defined as motivation to engage in a task for external reasons (Ryan, 1985).

Harmony with Kleinginna and Kleinginna, Geen (1995) as cited by Abaynesh .E (2012) indicated that motivation is a word used to refer to the direction, intensity, initiation and persistence of human behaviors. It is believed that motivation is an individual's internal status toward something. It has power to enhance the strength of the relationship between the input and the output of human behavior. Motivation refers to the reasons for directing behavior towards a particular goal, engaging in a certain activity, or increasing energy and effort to achieve the goal.

2.4.2 Motivation of student in mathematics

Motivation on the student feeling in mathematics is important but the number of student in USA wants to take more mathematics in schools are declining steadily. Different researchers interest in studying motivation in the content domain of school mathematics need to examine the relationship that exists between mathematics as a socially

constructed field and students desire to achieve better. The problem considered important enough for the National Council of Teachers of Mathematics (NCTM) to place the motivational domains learning to value mathematics and becoming confident in one's own ability as two of its foremost goals for students (NCTM,1989).

On the National assessment data from the 1980's of NCTM have American children tends to enjoy mathematics in the primary grades but level of enjoyment tend to dramatically decline when children progress in to and through high school. And also different Spanish researchers learning mathematics requires highly motivated students because it requires reasoning, making interpretation and solving problems in mathematical issue and concepts. The challenges of mathematics learning for today's education are that it requires disciplined study, concentration and motivation. To met these challenges learners must be focused and motivated to progress. Broussard and Garrison(2004)as cited by Abaynesh(2013) examined the relationship between classrom motivation and academic achievment .Learner's motivation can show vast differences as the function of the learning situation and their appraisal in language class. So one of the key points is to motivate students intrinsically, and this leads to autonomy. Motivation is distinguished between different types based on different reasons or goals – intrinsic and extrinsic motivation. Intrinsic motivation refers to doing something because it is certainly interesting or enjoyable. While extrinsic motivation refers to doing something because it leads to a separable outcome (Ryan, 1985).

2.4.3 Factors affecting Motivation of learning Mathematics

Learning mathematics for student's motivation and their scores declining and incentive are the basic element that influences academic achievement. And the other element that influences student's motivation is the learning environment and learning style and the capability of the teachers to motivated the class. A student may arrive in class with a certain degree of motivation. But the teacher's behavior and teaching style, the structure of the course, the nature of the assignments and informal interactions with these all have a large effect on student motivation. Motivational differences between high achieving and underachieving mathematically gifted students. Researchers /scholars, agree that males

tend to feel more confident in learning Mathematics, and also they are more convinced on the usefulness of the subject. So,

Here in the study data 308 sample participants in 11th grade and 12th grade at preparatory school student to measure their motivation in mathematics from the questionnaire items. Bandura's states that students motivation is a construct that is built out of individual learning activities and experiences, and to enhance learning high motivate. The relationship between the index of mathematics motivation/anxiety and Mathematics achievement was Positive/or negative and Significance and the coming investigations indicated that students who have positive perceptions or attitudes towards mathematics showed better achievement in both mathematics and science Kouassi (1999) states the definition of motivation into three levels that are the language level, the learner level, and the learning situation level. But here only consider motivation as a learner level.

2.4.4 The relationship between motivation and mathematics achievement.

The motive to achieve may alter the tendency to success in two different ways first it may influence the value a person place on successful task performance and secondly it may influence the extent to which a person feels, confident of being able to master a challenging task (Kukla, 1978), Schmitt & Brunstein (2004) as cited by Abaynesh .E (2012) explain this point further that individuals high in motivation anticipate greater achievement than individual in low motivation. Nyagura and Chivoru (1997) as cited by Niftalem Diane (2011) said that the unmotivated students are low achiever in African's mathematics achievement and motivation to predict academic success.

2.5 Student Attitudes of learning Mathematics

2.5.1 Definitions of Attitudes

confidence is essentially one of an attitude component that allow us to have a positive and realistic abilities. It is characterised by personal attributes such as assertiveness, optimism, enthusiasm, affection, pride, independence, trust, the ability to handle criticism

and emotional maturity. Confidence is learned, it is not inherited. If you lack confidence, Edwards (1957) states the definition for attitude as the degree of positive or negative feeling associated with some psychological object which includes any symbol, slogan, phrase and training institution or scientific idea. Particular in the subject given school with different teachers & trainers considered must psychological elements. It is clear that one of the main objectives in education is the advancement of desirable attitude in the students' knowledge, skill & value and learning experience to advance their attitude. Thus, it is necessary that every teachers out to understand both the definition and various scholars explanations towards attitude.

Aggarwal (1998) states that point out teachers are required to develop several attitudes in the student's attitude toward learners and attitude toward collaboration. Lahey (2004) persons, forms of readiness, approaches, and withdrawing student's behavior, fallings of creativeness and wrongness, and motivation and wrongness, and motivation and not motivating or anxiety for the subjects interrelated to attitudes. An object that has correlated with positive feeling with some psychological object or motivated or they have good favorable attitude towards the subject/object. Or else people who have opposite of that above sentence have negative feeling or not motivated to take a time with that object.

2.5.2 Attitude towards Mathematics

Attitude towards mathematics plays a vital role in learning process of Mathematics and for successful achievement. Its effects on student's achievement were seen from the above two instrument namely attitudes scales & achievement test of the students respond on the governmental schools. May in the learning process, the structure of the school support, the family background, and the students intrinsic or extrinsic Motivation besides to anxiety have cumulative factors or challenges to their achievement or effects their attitude towards Mathematics.

Barton (2000) ,Furinghett and Pekhonen ,(2002) states both student positive attitude towards mathematics leads towards better achievement and success in mathematics which attempts progress on their attitude towards Mathematics at different grade level provides

base for further studies in mathematics. Males and Female learners of mathematics have almost same type of achievement scores, because this gender based gap is decreasing day by day. Fennema & Sherman (1976) girls are negatively influenced by their sex role stereo typed. On similar approach our government always declares the message and gives option to enhance science and mathematics towards student attitude and how to use science and technology including Mathematics and also different researchers agree every field of life has been tremendously changed so it is necessary to compare the attitudes and achievement in Mathematics On gender basis.

2.5.3 Influencing factors on students confidence, enjoyment and usefulness towards mathematics

Confidence is a dimension of attitude to mathematics that appears to have particular relevance to teachers' practices. Confidence is also defined on the dictionary of Encarta as belief in own abilities, assurance or a belief in your ability to succeed (Microsoft® Encarta® 2009). The above three component were used in the study to measure student attitude in mathematics and different scholars concluded that positive attitude towards mathematics leads students towards success in Mathematics. Poor attitude toward Mathematics has one factor that has contributed to lower participation and success of girls in mathematics Willis in 1995 and Fullarton in 1993 in the area of science and technology, every field of life has been tremendously changed with attitude and achievement in mathematics.

- **Student's confidence towards mathematics**

Student's confidence is another ingredient for education of mathematics. Having a positive attitude towards mathematics student with enjoyment in mathematics and have confidence in one's own ability to do it. Majority of the students love mathematics but those who in the low achievers level case to Mathematics have a different attitude. Here in the study it is used to assess attitudes towards Mathematics in terms of self-confidence; students Enjoyment & usefulness of the subject and use the convenient learning styles. Fennema and Sherman (1978) identified as critical, beliefs about the usefulness of, and confidence in learning mathematics, with males providing evidence that they were more

confident about learning mathematics and believed that mathematics was, and would be, more useful to them than did females.

One of the main objectives of Ministry of education in our country is the establishing of desirable attitudes in the students for instance giving Civic and Ethical education for multipurpose. Aggarwal (1998) view several attitudes in the students relates to attitude toward self, group work, subjects and friends. A person who has associated positive feeling with some psychological objective is said to like that object or to have a favorable attitude towards the subject. Thus, attitude is considered as tendencies to react favorably or unfavorably towards the subject.

In the early age, we can learn from other attitude and built our experience positively or negatively, this idea also concerns for student attitude development.

- i. Integrative, meaning the development of an attitude through accumulation of experiences over a long period of time in which the sum of all these influences in the individual in a specific direction.
- ii. Differentiate, that means it is the development of an attitude by splitting off a specific attitude from a more general one.
- iii. Shock, it is clearly attitude development by shock is due to an unusual or painful experience etc...

❖ **Measuring of Attitudes.**

In the science world the scientific treatment of attitudes requires quantification, and measuring of attitudes and the opinions can be considered as expressed attitudes. Attitudes can be measured using different techniques like achievement test and questionnaires (Aiken, 1992).

❖ **Attitudes scaling**

By considering one of the variables relates to student mathematics achievement & family related characteristics on learning mathematics. The study uses one Likert scale background questionnaire with family related variable and five point Likert scale questionnaires on different variable have been modified from different scale items for the measuring student's mathematics attitude. The scales are related to score & their response

on their achievers levels. Attitudes, as a factor related to students difficulties in mathematics, and refers to learning predisposition or tendency of an individual to respond positively or negatively to some object.

According to McLeod (1994) state that attitude towards mathematics is just a positive or negative emotional disposition towards mathematics. Attitudes towards mathematics as measure of liking or disliking of Mathematics, a tendency to engage in or avoid mathematics a tendency to engage in or avoid mathematical activities, belief that one is good or bad at Mathematics, and belief that mathematics is useful. It includes a set of items of equal value and asset of response categories constructed Aiken (1992) and these scales are very popular among social science streams.

❖ **Enjoyment towards Mathematics:**

Lewis Aiken investigation the developing and influencing of attitude toward Mathematics have dealt almost exclusively with the enjoyment of the subject or anxiety in its presence Aiken (1992); McLeod (1992) attitudes defined as apposite and negative emotional dispositions of the students.

2.6 The Relationship between attitude towards Mathematics and achievement in Mathematics

According to Mulugeta (2010) emphasized that the importance of cognitive component to every attitude component and subscale component on these investigations. These two relationships must be emphases on the mathematics. NCTM (1989) and National Research council (1989) have encourages Maschen educators to incorporated affective factors with cognitive factors in mathematics learning and teaching, which is cited by Xin (2014) one of the description domain in attitude according to McLeod (1992) and, where as knowledge and thinking are considered descriptions of the content & process of human mind Brown and Borko (1993).

Xin. & NandKishor (1997) cited by Aiken (1992) discussion, for attitudes description. Here the study Attitude towards mathematics (ATM) includes student's enjoyment,

confidence and usefulness of the subject that relates to achievement. So the major purpose of this study is to investigate natural science student's related variables impact and family related characteristics in mathematics achievement at the preparatory schools in Oromia region surrounding Addis Ababa. Even though teachers use different teaching methods and use their effective capacity has been used legitimate approaches to producing unbiased predictions of the dependent variable.

2.7 Family related Variables

2.7.1 low socio-economic level

According to Adamu Genaro (2004), student whose family earned about \$4000 annually out performed one whose family earned only \$15000 annually. Students in communities with high rates of welfare and unemployment are less interested in school. However; the negative effects of living in a low income community be offset by parenting study and social relationships with persons outside the community. Socio-economic factors is the status of the students could determine the level of the achievement test towards mathematics and income levels such as very-low, low, average ,high and very-high that determinant factors for the development of the skills on the education Swatson et al., (1982). And the economic activities decisions and polices in the attempt to solve economic problems by proposing alternatives options and mechanisms .Because of economics is the study of the process of the production distribution, and consumption of goods and services without properly addressing the various economic problems at the local, national and international levels, it is nearly impossible lasting peace and tolerance etc...This cited by Addis Alemayhu, (2013), Addis Ababa University.

2.7.2 Family Education status

Family education is the most predictor of participation in mathematics and science (Beryman, 1983; Malcon et al., 1985) as cited by Adamu Genaro (2004).From his view research view conclusions students with one or more college educated parents performmed significantly better than students were not high school graduates.

Kate Christian, Frederick Morrison and Fred Bryan (2002) determined that family education level and student a care environment could influence individual student's achievement in mathematics. The factors can play into student's achievement, on aspect

that is not frequently looked at the student attitudes towards education in different subject. Is there any significant impact of family background variables, on achievers level and attitudes of students in mathematics achievement. In addition, studies show that parents, peers, and teachers are more tolerant of girls not succeeding in mathematics (Tobias, 1980). It is expected that because the student is a girl that she will not perform as well as her male counterpart (or classmate). Educated family or parents are aware of the benefits of educating their children and give more value to education and expect their children to become well educated too. They also try to give rewards for their child for motivating and encouraging them positively.

This study will examine four government preparatory school student attitudes and achievement in mathematics. Natural science students were is given standardized assessment test from National Educational assessment Evaluation Agency Exam Booklet 12. This study can be shows more clarity concerning what allows students to succeed in math or what is blocking their success and for some reasons difficulty of the subject include external anxiety and student's confidence has rarely been a consideration. So, attitudes of students indeed prove to be significant factors in students in achievement, then the teachers can adjust their instruction to include motivating element especially for low achievers. Let us determine the level of student's confidence in mathematics achievement.

2.8 Factors which relates to family and affecting students achievements in mathematics.

Mullis states that affecting viable is student's achievement in mathematics such as attitude, motivation and gender. Let examine their contributions and explain the variance of students' mathematics achievement and their family background. The trends in international mathematics and science study (TIMSS) there is appositve relationship between student's achievements in mathematics and home background variables such as parent's education status. For instance 54% of the Iranian students have a high positive attitude towards math; their average mathematics achievement was much lower than the international average. Rech (1994) states that he had examined the relationship between

student's characteristics such as attitudes towards mathematics and home background as well as motivation have confirmed. According to Mekasha (2005) states that favorable or unfavorable attitudes towards the student achievement in education treated accordingly. And Similarly, Mekasha Belete (2000) the student's attitudes towards an academic subject particularly female pupils participations are crucial factor in learning mathematics and achievement in the subject Elizabeth Fennema and Julia (1970's). These shows that the attributions influenced by the variables because of hard work, good luck and natural talent. Even though students may attribute their failure or success to the mentioned variables, the efforts that they make in order to learn mathematics emotions at school or do homework at home probably have an effect on their achievement.

CHAPTER THREE

RESEARCH METHODOLOGY AND DESIGN

3.1 INTRODUCTION

This Chapter consists of the research methodology, Data source and Data collection instrument, method of data collection and procedures, and method of data analysis.

3.2 RESEARCH DESIGN AND METHOD OF THE STUDY.

Research design is considered as a corner stone and the blue-print of different study in research. So it pursuant to the purpose of this study, the researcher implemented a non-experimental and descriptive survey design to collect the necessary data. And study seeks to investigate the relationship between student attitude and their achievement in mathematics, motivation and achievement, anxiety and achievement, and learning style and achievement in mathematics and student family background in terms of income, family size and family education in mathematics achievement. This paper add the depth descriptions of that I have seen before in the pilot test findings in term of different reliability coefficient results from the two sections sample student at the preparatory school in the zone. Data were collect from 308 students from four governmental schools for this final study. Student achievement test in mathematics was measured using one and half hour exam extracted from equivalent to the university entrance exam booklet and modified the exam in mathematics in the coverage of content fairly distributed and identified difficulty level. The contents of validity of the questions assessed by the National Education assessment and Evaluation Agency experts and add comments from teachers in Holeta preparatory school for modification.

The modified items for the attitude scale and established psychometric properties were used to measure attitudes towards mathematics. Attitude scale towards mathematics inventory (ATMI) by Tapia & Marshia (2004), consists of 33 items that measure three variable namely Student enjoyment ,Confidence, and usefulness of the subject .Besides the student mathematics **anxiety and motivation** of Fennma–Sherman altitude scale consists of 10 and 11 items respectively was added to the lost of student that was used for

this study. So their attitude is measured through 5 point Likert scale: that is 1- strongly disagree, 2-disagree, 3-undecided, 4-agree, and 5 stands for strongly agree. The information inserted in SPSS and data is analyzed through reliability, regression, ANOVA, and descriptive statistics results indicate that there is high reliability in the data. The researcher used 33 items to examine attitudes of the students and develop correlation with marks obtained in school, sex, grade, achiever's level, and family background.

Kothari (2006) states that research design help the researcher for planning of the methods and for collecting the relevant data and techniques to be used during analysis. The obtained information from the participants based on the objectives and the nature of the selected variables in this study will be studied. Therefore, the research approach was a descriptive survey and non experimental design. The design is considered student attitude with its component items and motivation and anxiety items were given by Questionnaire and achievement test settings were used. Survey research design is used an investigating opinions and preferences of learning styles with it components and family background variables in student mathematics achievement.

3.3 Method Of the Study

Here the objective of the study was to investigate the factors that influence natural science student achievement in mathematics at preparatory school in some selected variables. The student related variables are attitude, motivation, anxiety and learning style in mathematics. By using the quantitative approach and descriptive survey were employed in this study. The study also examine these variable in terms of school, grade level, Sex variation, Achiever's level and family income, family education and family size in students achievement. Identify best styles of learning in mathematics, avoiding math's anxiety and how to develop positive attitude. Therefore, the current study is not only identify the variables impact in learning mathematics but also search recommended comments with justification to minimize the variables influences in mathematics achievement.

Thus, the study seeks to investigate the relationship between student attitude and mathematics achievement, learning style, besides to family background variables. All the data's in the study is established empirically. So, the researcher used quantitative approach and these undertake quantitatively survey on 308 students from four preparatory schools out of seven governmental preparatory schools. These 308 participants from the **Holeta** 4 sections in grade 12 and 4 sections in grade 11; from these 8 sections in the school I select 2 sections from grade 12 and 2 sections from grade 11 of the total participant **100 out of 419** natural science student in the school. Similarly from **Burayu** school 2 sections in grade 12 and 12 section in grade 11, from these four sections I select 2 sections from grade 11 of the total participants **80 out of 253**. Similarly from **Sululta** school 1 section in grade 11 and 1 section I grade 12 from these two section I select each section from the grades that is 1 section from grade 11 and 1 section from grade 12 as a total participants **80 out of 98** student from the school. Finally in **Sandafaa** school I select 2 section out of 2 section in grade 11 and 1 section in grade 12 the total of 48 student out of 147. Therefore all the participants from each school was 308 out of 917 natural science students in all the sample schools. Thus, remains three school in the zone namely **Chenco** (Male=130, Female=86), **Gelene** (Male=32, Female=17) and **Sebeta** (Male=182, Female=115). Therefore, including with these school all the population in the zone schools is 1479 (F=527 and M=952) from all the sections (Appended in Table 2).

The five-point Likert scale was used in the requested questionnaire. And all the items under each variable and in the standardized achievement tests scaled, the design is used to describe current existing characteristics and their relationships on different independents variables are studied and established. It is convenient to establish the relationship of the variable impact on student achievement.

3.4 Population and sampling techniques

The descriptive survey was used in order to collect data from the selected preparatory schools based on the variables to improve their mathematics achievement. Thus, there are

not more than seven preparatory schools in special zone. All the schools were also scattered in different direction in the north, west, south and east direction of Addis Ababa, the researcher select school from each direction by cluster sampling .The study consider different section from grade 11 and grade 12 by lottery method. From the unpublished document of education statistics of (Annual abstract of August, 2005) in the region education Bureau in special zone surrounding Addis Ababa. This may not be accomplishing the requirement of MOE standard and expansion of the schools is timing increases. So the higher official handles the responsibility body's upgrade the school expansion status. Nowadays 7-preparatory schools care their responsibility of education in the Zone. But during the time when data's collection from the required information that should be taken three schools missing.

However, the study did not necessarily include all the population under investigation exclusively Social science students, in this case from all the governmental preparatory school natural science students in the zone few were selected for the treatments. The simple random sampling techniques were employed to select the school and sections were from the school by lottery method. First school, then sections was selected by using lottery approach. The two main reasons for design the two techniques, such as lottery and cluster sampling techniques, were for students convenient due to various administrative reasons and various geographically locations. Thus, four out of seven schools were cluster selection approach was used for the final study. The total number of governmental preparatory schools in special zone is distributing scattered.

The section was done using a table by lottery method, by assign consecutive sections from A to F and not including the social science student sections in each school. (See Appended table 2). Similarly, using similar simple random sampling techniques one chosen at any stage during sampling process and each subset of k -individuals has the same probability of being chosen for then sample as any other subset of k -individuals. Two sections were selected out of seven schools for the pilot study fro Holeta. These two sections were not included in the final study and a subset of the individual chosen from a longer set. The researcher tries to avoid any unbiased surveying techniques.

3.5 .Study Area and Participants

3.5.1 Study Area

The study area focused on special zone of Oromia region surrounding Addis Ababa particular Holeta, Burayu, Sululuta and Sandafa preparatory School student was registered in the academic year 2006 E.C Natural Science stream.

A. Holeta: Holeta Genet is found in the west of Addis Ababa of Oromia region, Liyu Zone, wolemera woreda. The town established in the last decade of 19th center by emperor Menelike II in his campaign of expansion to the west. The town was served as a military center of the emperor. The town lay in the road to Ambo from Addis Ababa , 33km from the capital .The town is divided into 5kebels. The town have two vocational institutions ; Major General Hayelom Ar'aya and Major General Mulugeta Buli military colleges and Holeta Agricultural TVET college, 1 preparatory schools and two secondary Schools. The research conducted in Holeta preparatory School. The school has two organizational structures namely Holeta secondary & preparatory School. The school is located and near to M/G/H/Ar'aya Military Academy. The school has 424 students, & 4 Mathematics teachers at preparatory level and two administration bodies.

B. Burayu: is found at the short distance of Addis Ababa and one of the, Liyu administrative town in the special zone of Oromia. The school is very near to the main road of Holeta. And the preparatory and the secondary school administrator use the same office and the same compound and the schools are not in the different compounds. The town functioning as one of the industry zone in our country. Majority of the students are gone to Addis Ababa. Some of the students come from economically average income family background.

C. Sandafa: is nearly found in the East of north from the capital of the country and the town is in the Oromia region in the special Zone surrounding Addis Ababa. In the

town, Sandafa preparatory school is the only best governmental school. All students come from the urban and rural areas to the school. From my observation the school environment and the buildings. The school and the officers are not well organized and in advanced status. As some informed orally because they hate the subject teacher, they dislike mathematics. Therefore, they are not good mathematics. This may be because of their teacher and they are not motivated and haven't positive attitude towards mathematics. Therefore, there are not good at mathematics knowledge. The town contains one of the higher policy institutions called Sandafa policy University College and give training for governmental official and built capacity of our country policy force.

D. Sululita: is found in the north direction of the capital and from the center. It is about 26km far. In Oromia region and preparatory Schools, This school is to the main road to Bahir Dar to Addis Ababa and the year of establishment of the school from all the other sample preparatory School recent. Students in the school came from economical capable family background. These are student staff oral giving information and the participant.

3.4.2 The participants of the study

In this study the participants were from grade 11 and grade 12 preparatory school students in different geographically location in the special zone of Oromia region surrounding Addis Ababa. There were a total of 308 participants. The total student in the four schools is 917 natural science students at grade 11 and 12. The information was collected from participants who relate to variables attitude (enjoyment, confidence and usefulness), motivation and anxiety, learning style in the entire school participant.

3.5 Tools for Data Collection

In order to gather relevant data for the study, two different tools were employed achievement test and questionnaires with different component and supportive data from researcher's precisely observation in the class and out of the class. The questionnaires are

modified from different researcher scale and tested by the pilot test from simple randomly selected data.

3.5.1 The Achievement Test

The achievement test was selected and modified by the researcher from the higher institutions entrance examinations Booklet in grade 12 mathematics exams. It is prepared by National Educational Evaluation and Assessment Agency. There are elementary modification and arrangement were taken on questions for the two grade according to there outlined portion. The exam is approved by the agency officer and cross check by different mathematics experts. Thus, the achievement score interrelated to their response and the variables drawn from their family background and student related. In order to select the achievement tests the investigator followed the two general approaches suggested by Brown (1993).

The table of specification for test items includes the cognitive, Comprehension and application questions and discuss on the above two approaches were selected because of the nature of the subject. However, more emphasis was given to knowledge & application. The type of the test items was multiple choice, since it can be used to measure understanding or ability that can be tested by means of any other items this supported by (Ebel, 1979). Another important reason to use multiple choice items is it was possible to include a large number of question what Brown (1993) state consequently on his scripture and 32 multiple choices question for grade 11 and 23 multiple choice question for grade 12 were selected by the researcher. The achievement test was prepared by National Education Evaluation, Assessment Agency and selected randomly.

In order to check logical sequence, items are reviewed, the questions were given to colleagues, and then researcher took comments and being a mathematics teacher he organize the questions from Ethiopia University Entrance examination subject Booklets. Then after making the necessary adjustments and modification for the comments and suggestions given from different directions, the questions administered to select sample in the pilot study, the questionnaire item review includes different literature background.

Comment on chapter coherence, content difficulty and chapter coverage, and grade difference.

3.5.2 Questionnaire

Through questionnaire I met participants in their class and mathematics teachers in the department. I introduced my self to them and explained the purpose of the study. I also assure tat their responses would be kept safely and serve for only this research purposes. So all the information forwarded by participants based on requested variables kept their secret honestly. The current study practice and changes in the short period of time and the data obtained from relevant source. In the study, this was one of the instruments for the data collection. The attitude items were selected in the questionnaire and modified from Elizabeth Fennema-Julia Sherman (1978) mathematics scales .confidence items and usefulness from Beamer and Linn and Hyde (1983) and (1989) respectively. Anxiety also discussed by Hauge 1991, Enjoyment from Thorndike –Christ 1991 and motivation from Betz’s and Hacke’s 1978. After getting their consent, I used a sample random sampling techniques to identify the samples that would complete the questionnaire to the sample class presents students and made arrangement as when this completed questionnaires need to be returned to back. A total of 308 completed out of 917 students and returned the questionnaires on the set date. The questionnaire was designed to measure student’s attitudes including their component; Enjoyment, confidence and usefulness, students anxiety and students Motivation. Students learning styles and its component variables such as Auditory, Collaborative, visual, independent and dependent learning style items also selected from the Grasha-Reichman (1971) and Beamer student learning style items and added some modification. All the variables are treated inclusively students with family background variables.

The questionnaire focused on one the items with one point background Likert scale and five point Likert scales were used and ranged from strongly disagree to strongly agree. And the next tools were achievement test.

- A. Socio-economic status of their family background in learning mathematics mainly includes educational background of the family, family size, family income and family education.
- B. Anxiety occurs in situation only perceived as uncontrollable or unavoidable, but not realistically and David Barlow defines anxiety is a future oriented mood state in which one is ready or prepared to attempt and to cope with upcoming negative events. Ashcroft & Kirk's (2001) states that study result of student with high mathematics anxiety experienced smaller working memory spans.
- C. Achievement Test: Achievement test focused on what students have been learned. On Husen and Wain (1994) view the function of achievement test is to measure the extent of students learning with respect to what the schools address to teach and students intentional learn. Achievement is used to make the separation between measuring individual's student's effectiveness in the class or in the school performance.
- D. From Anthony (2000) document, motivation is an influencing factor in student success. Motivation is also related to mathematics achievement.
 - Low anxiety
 - High motivation
 - High-self-confidence
 - High achievers

3.6 Data Collection Procedure

Data was administrated in one session and were conducted in the student's free time. By requesting student's voluntariness and the investigator reached consensus regarding the time. On the basis of the pilot study it was conducted by the investigator when the instrument was revised. Besides to select the representative class room from each school proportionally by lottery approach and used to fix sample size was employed, as the number of sections and school variations. It is asserted that it was generally better during cluster sampling to select a sample from the population in two classrooms. The pilot were administrated from Holeta preparatory school two sections from grade 11 and grade 12 by simple randomly selected technique, which comprised 46 students, twenty of them is

female and twenty six of them is male. The total number of student in both sections is 88. This is from grade 11 and grade 12 but some of the students not voluntary to write the requested information properly and they were failed to respond and complete the data. The pilot sample contains 42 students (F= 18 and M=24). The data were collected during the last week of April 2014 and it is convenient time for gathering information's. It was the appropriate time to cover topics.

3.7 Validity and Reliability of the Instrument

3.7.1 Validity

Validity is the most crucial characteristics that an achievement test should possess. The questionnaire here I used here in variable and having five point likert scale approach. The variables like attitude, learning style, motivation and anxiety and family related variables were checked and give directive comment by the researcher's advisor. And also the achievement test was evaluated by professional experts. I was request mathematics teacher in the schools for improving the content of the test items, arrangement. Special test validity is concerned with the appropriateness of the interpretation in the test scores. Validity divides into face, content and constructs validity. Both instruments were checked through pilot test whether the students were from the same grade level or not.

Face validity is determined by examination and appearance of the exam case shows that the intentions of others opinion and feeling. Content validity is the degree to which an exam to measure an intended content area and sampling on the intended content areas that address the variables being tested. Constructive validity is the major important form of validity on fundamental questions. The content validity of each item in test was approved in the National educational Evaluation, Assessment Agency experts' and preparing officers. And checked by the subsections body and organized by the researcher for the sake of this study. And also cross checked by subject teachers and department heads. validity were given this instrument be optioned for studying student mathematics background and provides feedbacks and they also gave suggestion about test bears and the class room teacher was analyzing the relatedness of the test item to the intended objective .

3.7.2 Reliability

The study also check the reliability and discriminating the items in both the achievement test and family related variables and student related variables by using SPSS 15.0 software.

In the scientific world accepted range for reliability coefficient between above 0.70. Besides the pilot test was to test the research instrument to fix the standard ranging on the scale. And some items were discarded to coincide the standards. The pilot test were administrated from Holeta preparatory school two selected different sections in grade 12 and grade 11 by simple randomly technique. From the Kereji and Morgan determination procedure I fix the total participants in the study 308 out of 1479 population in the zone. This figure is exactly 33.59% out of 100% population in the 17 section out of 917 students in four schools and from the total three school student at preparatory level not including. The three schools have the total of 562 students. (See Appended table 2A) the test extracted from mathematics examination prepared by educational evaluation, assessment agency for grade 12 that includes both grade level and a wide range experienced school teachers on the subject at grade 11 and grade 12 level for the purpose of improving the test items. Both tests included the entire unit.

The questions in all variables scored telling for the student's academic status in Mathematics relates with anxiety, motivation, attitude and learning style towards Mathematics in achieving best scores in the subject. The items from the standard test based on their text book. It is supported by Brown (1993) literatures. Those who achieves well and they are better on such variables. For this study the researcher gave more emphasis on knowledge and application part. And the achievement test includes a multiple choice that can be used to measure student ability. Using simple random sampling techniques one school was selected for pilot study. The objective of the pilot study was to test the research instrument, specially the attitude scale, motivation scale, anxiety scale.

Reliability is summed up by the word consistence and reliability has been defined as the degree to which test scores for a group of test takers are consistent. The pilot comprises 46 out of 88 students from both sections (F=20, M=26). Of this 42 papers were treated as a pilot study and remains four papers were not properly filled by respondents from two sections. Reliability is expressed numerically on the normality range between -1 and 1. So, Test scores are said to be reliable if the scores obtained from the test would have been essentially the same when the test was administered to the same test takers. Eble(1979) test correlation was discussed and experts agree on constructed educational achievement test often yield reliability coefficients of 0.90 or above.

The test was treated in Holeta preparatory school from grade 11th and grade 12th who were not participate in the final study. Internal consistency reliability coefficient for each item found by Cronbach's Alpha formula, and student mathematics achievement test and reliability coefficient for variables, such as attitude in 22 items is .766 and learning style variable reliability of the 35 items is .856 and for motivation variable in 10 items is .719 and for anxiety is .690 for 11 items. Besides, reliability statistics for family related variables like education status for 1 items .793. And regression analysis was also utilized to examine relationship between student's related variables and grouped variations in each variable and test.

3.8 Method of Data Analysis

After the completion of the data collection the study were organized and processed separately by using instrument for appropriative analysis. I have edited, classified, coded and tabulated the data in SPSS software. Here the study uses different techniques for data analysis pertinent to the variable in the study. Since the purpose of editing is to detect errors, omissions (Kotaher, 2006). I have made a careful inspection of the complicated questionnaires during the collection of the questionnaire from each respondent. And coding is necessary for efficient analyses I initial took coding decisions during the designing stage of the questionnaire.

The data were analyzed using SPSS software and manually as well as the normality of the items under each variable from -1 to 1 in the pilot test result from the two sections. I classified the collected data into groups of the classes on the basis of the basic research questions in terms of sex, school, achievers level, grade level, family size, family income and family education with respect to student attitude and its component, Anxiety, motivation learning style and its component and student mathematics achievement. All the variables were checked and the researcher directed under the comments and constructive supportive from his advisor. Quantitative methods of the data analysis were employed to substantiate the study. The descriptive statistics was used to rank the participants level and determine agreement of the majority items used to measure the degree of correlation between the achievement and the independent variables in mathematics. Moreover mean, SD, correlation, T-test ANOVA, and regression of the reliability statistics were used for each by SPSS result.

Item Analysis: For multiple choice tests, it can be said how much the effectiveness of the individual characteristics. In my observation all the above variables have the influencing factor on student mathematics achievement. To identify the content area on the subject regards to their knowledge, comprehensive and application of the student academic capacity and its benefit for individuals. Lee Cronbach (1951) states to provide measure of the internal consistency of a test or scale: It is expressed as a number between 0 and 1. Internal consistency described the extent to which all the items in a test measure the same concept and it should be determined before a test can be employed for research purpose to ensure validity.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRATION, RESULTS AND DISCUSSIONS.

4. INTRODUCTION

This chapter deals with the analysis and presentations of the collected data from the participants. The data were collected by using the data gathering tools like questionnaire and achievement test and organized statistically. The average value in the achievement test score be compared to the standard mean value in the subject and here selected variables are related to student and family background. To determine all the variables impact on student achievement. Basically the entire variable contains different items and they were analysed by the descriptive approach quantitatively. Numerous ideas were processed statistically and using mean, standard deviation, t-test, Pearson product correlation, ANOVA and multiple regressions. Thus, the quantitative analyses of the study on the data were collected from four governmental schools.

The Holeta, Burayu, Suluta and Sandafa preparatory schools are participate in current study from the special zone out of seven preparatory schools surrounding Addis Ababa in dispersed location. In this study the sample 104 (33.7%) are female & the rest 204 (66.3%) are male students participate out of 309 and 608 female and male students respectively. The figure is also shows 33.55% of the participants are male student from all the school male students and similarly 33.65% of the participant is female students out of the female population. The sample participants (308) also 33.58% of the total population involve as participants and they are requested to give relevant information in the questionnaires items and test particularly in mathematics related to their achievement besides to all the related categories in the study. This study covers 20.82% of the total population in the Zone school representatives. 21.42% of them are male representative student in the zone and 19.73% of them are female students from the zone female student. (This is from Appended Table 2).

The presentation and analysis of the data were done to answer the basic research question stated in chapter one. The academic achievement of students in mathematics is based on the current achievement on their achievement test.

4.1. Back ground of the respondents

A. Respondents Background by Student Characteristics.

Here all the information given below quantitatively and explains of the respondents background and student's characteristics in terms of Sex, Grade, School and Achievers level.

Table 1: Frequency and Percentage of the participants in terms of sex, grade level, school and achievers level.

Variable	Categories	Number of students	Percent %
Sex	Female	104	33.76
	Male	204	66.23
	Total	308	100
Grade level	11	221	71.8
	12	87	28.2
	Total	308	100
School	Sululta	80	26.0
	Holeta	100	32.5
	Burayu	80	26.0
	Sandafa	48	15.6
	Total	308	100
Achievers' levels	High	18	5.84
	Medium	131	42.54
	Low	159	51.62
	Total	308	100

Here in the table 1 above the majority (32.5%) of the students were participated in the study from Holeta Preparatory School. This is because of the total number of student were registered in the school. There is also in the table 1 above shows that 26.0% of the student's participations from the two school namely Burayu and Sululta preparatory schools equal number of frequency and 15.6% of the student from Sandafa preparatory school. Especially the percentage of achievers level shows that almost half of the participants are low achievers from the total number of the student registered in the academic year 2006 E.C in different school geographically dispersed areas in the zone. It

shows that the background of the participants from grade 12 (N=87) students and grade 11 (221) students included in this study and such a difference because of the time that I were collected data and almost all grade 12 student not attend regular class in the school because they spent more time on self preparation at library or at their own home for the entrance examination.

Since student in the school is countable and the total number of the sample participants I were selected and in the table 1 given above that is expressed in numerals and in percent. Three hundred eight students were participated in this study includes 204 (66.2%) were male and the rest 104 (33.8%) of them were female respondents from the four schools. This difference from the student figure depends on the presents of student in the school.

The table 1 also showed that the total 308 respondents grade level, 87(28.2%) were grade 12 where as 221(71.8%) were from grade 11 in different schools. Student was registered in the above indicated academic year. And all these participants divided into three levels 18(5.84%) were high achievers, 131(42.54%) were medium achievers and half of the participants, 159(51.62 %) below 50% were low achievers. This numeral figure is used as a sample participants in the study just we compare to the number of students in the school were registered in 2006 academic year with different categories and student achievement score in mathematics.

B. Respondents background by family Characteristics.

Here for the second time I explain student background because of their family related characteristics and the information listed below in the table gives detail explanation about the student family related variable. The table shows that the collected data which relates to family background information quantitatively. All the data included in the study about family characteristics as family income, family size and family education in different levels. See Appendix A for detail of the information from the respondent's background under each quoted variable here. The basic aim of this variable in the study included was the exploration of the relation ship between income, family size, and family education status and student mathematics achievement.

Table 2. Number of respondents back ground by family characteristics (family education, family income and family size) and their Percentage.

Variable	Family Background level	Frequency	Percent
Education	Illiterate	48	15.6%
	Primary	100	32.5%
	Secondary	73	23.7%
	Diploma & certificate	56	18.2%
	Bachelor & above	31	10.0%
Income	Very low	122	39.6%
	Low	91	29.5%
	Average	69	22.4%
	High	17	5.6%
	Very high	9	2.9%
Family Size	Very low	18	5.8%
	Low	86	27.6%
	Average	144	46.8%
	High	35	11.4%
	Very high	25	8.1%

Table 2 also indicate respondents background by student family characteristics that 48(15.6%), 100(32.5%), 73(23.7), 56(18.2%) and 31(10.0%) of respondents family education status were illiterate (families not attend any school), Primary school (families attend from grade 1 to 8), secondary and preparatory schools (grade from 9-12), diploma and Certificate, and Bachelor degree & above respectively. So the majority of the student comes from primary school attendant and educated family background, 100(32.5%). From the family background information listed in the table above the least number of the student come from Bachelor and above educated family background 31(10%). The above family background classification be expressed in the appendix A, represent and what the student family ground looks like in numerically statistics. And also high rank educated family status may not be sending their children's to the governmental school. Gizachew Ashagrie, Yekoye Dbebe (2004) states that family size classification on his research study in Ethiopia that I have used here and classify the family size in terms of family members by modifying his classification.

Because of how to manage for better explanation of the data be represent and written in the above table form from appendix questioner student response and to be given

information from their family background in terms of the following gap (Appendix A).When we examine family income of the participants from Table 2, showed that 122 (39.6%) of the respondents were lived with their family income below ETB 1500 (Very low). As the data stated above 91(29.5%) of the respondents family income of ETB 1501-2500 birr (low), 69(22.4%) of the participants were come from family having average income (ETB 2501-4000) birr, 17(5.6%) of the student from high income family approximately (ETB 4001 -5000) birr and 9(2.9%) of the student from very high income family (ETB above 5001) birr and here the discussion above in the table under the column of family background level is expressed in terms of the categories from appendix A part participant response about the family back ground income ranged level in terms of the Birr they requested in the questionnaires data's.

Besides to these and also their family size information from the table above,18(5.8%),86(27.6%),144(46.8%),35(11.4%) and 25(8.1%) of the student with family size very low (student with no brother or sister),low (student with one to two brother or sisters) ,average (3 to 5 brothers or sisters) ,high (5-8 brothers or sisters) and very high (above 8 brothers or sisters) respectively and the respondent forward their information about their family size. So ,here the family relate variables to student mathematics achievement and students attitude towards mathematics or learning style variable and let us see the impact of these variables on student attitude in mathematics achievement.

4.2 Achievement of Students in Mathematics.

The achievement of students in mathematics is obtained from the standardized achievement test selected from the agency document then modified the test for each grade level and these test score is compared with the average value 39.2 from the comment of my **internal examiner Kassa Michael (Ph.D) lecturer in Addis Ababa University** and mathematics education department head. So, the cutting point of 50% promotion policy of student's score regarding to the standardized value in the educational and training policy in Ethiopia with different average score point.

What is the level of the achievement of natural science preparatory school student test score average compare with cut-off promotion policy 50% considering the standard average value 39.2?

The above research question were used to determine the achievement level with compare to student promotion policy cut off and average value and it is analyzed by the statistical tools like frequency, mean and Standard deviation and one sample t-test was used. Study that focuses on academic achievement of the natural science student at this grade level in mathematics at different grade level and participant will be discussed in the following different tables.

Table 3.The Descriptive Statistics and one sample t-test for natural science student achievement score in the Mathematics test.

Variable	n	M	SD	df	t	p
Achievement Test	308	50.52	17.136	307	11.596	.000

Here in the table 3 above the p value is less than .05 significant was set as an indicator. This shows that there is significant difference between the student achievement score average value and standard average value in mathematics education. The total score result in the table from 308 participant mathematics achievement test score out of 100% in the given exam result. The student achievement test score average value compare with the standardized average value of 39.2 shows significantly to the above descriptive statistical result. This can be conclude that there is significant difference of mean comparisons between descriptive statistics to student score average ($M=50.52$) with the standardized subject average value. From this standardized and the promotion policy cut off point 50%, 159 student percentages out of 308 participants is below 50%. Even if Student achievement score average is $M=50.52$ is above the standard average value in mathematics test. But according to the policy demarcation 51.6% of the student result is below. The obtained mean score was a result of a test labelled by mathematics the researcher as moderately and as easier than they often in the National exam from the agency. This difference was tested as shown in the table 3 with one sample t-test analysis value ($t=11.596$) at $P<0.05$. Each student result is converted to 100% according to the

responds creativeness. Since achievement exam is distributed to all the sample schools and invigilated by subject teachers.

Here in the study finding or the result is consistence with the findings from grade 12; boys achieved 56.1% score than girls 47.6% students' score relatively above 50% pass mark in mathematics according to Mulugeta (2014) iSER, Mathematics Education. But this finding is inconsistency with the finding of Fennema and Tarte(1995) literatures statement and coincides to National Educational Assessment and evaluation Agency examination for grade 12 and grade 10 student mathematics scores. Since the obtained value to finalize the sample participants of the students is exactly the representative of the population. Student in mathematics achievement nearly coincides to the cut off mark set by the country education and training policy document 1994 and regarding to MOE education experts. In Ethiopian higher entrance examination score in grade 12 student indicated that the mean percentage relates to 50% and above in mathematics was 54.3% and 57.75 of the students of grade 12 students mean score.

Nearly the mean value of the student achievement score not far apart from the cut off promotion policy document pass mark. And also here mathematics achievement test is not simple than as they think and expected to student promotion to the next grade level. Here their achievement scores relatively to the findings almost consistence to the findings which were seen by ICDR (2000) and a citation from Fennema (1995). Table 3 shows that student's scored on achievement test mean 50.52 that indicate student's level is **medium** which is nearly above the average value 39.2 and 48.37% of participants above the 50% and widely apart from the average value of 39.2. The ESLCE and admission to higher Education entrance expect more from this grade according to their hand book in (1985) issued on the candidates achievement at the end of 12th grade selecting the university entrants.

In Ethiopia, our country context, Mathematics is one of the compulsory subjects given for all students at preparatory level and this is consider as a compulsory criteria to join higher institution in our country and also attract the attentions on government. In the broader

sense knowledge of mathematics is a requisite of further study and by using this knowledge the individual is compute to intentional and national to minimize student's challenges in a given situation. The summative evaluation conducted by Institute of Curriculum Development and Research ICDR (2001) also pointed out that the secondary school students achievements in mathematics were the least compared to other subjects. The student achievement result directly relate to their requested items in the questionnaire. Almost all student participants in this study were written their name in the achievement test as well as questionnaires.

4.3. Learning Styles of students in Mathematics

The learning style and its components of the students obtained from the Likert scale contains 35-questions addressed in each component Auditory contains 8-items, collaborative contains 6-items, independent contains 8-items, visual contains 6-items and dependent contains 7-items) and the response of the students checked for the normality and it is possible to use the parametric tests. Learning styles can change over time and can be modified purposely. Since different individual have various learning style. And some times may not be things come to us not easily understandable approach's. To minimize this gap I need to identify the preferable and convenient style for better achievement in mathematics. Student tries to assure the preferable learning style for natural science student in mathematics and I try to identify the student weakness in each types of learning style. People also switch learning styles depending on what they are studying and selecting a preferred way of learning styles and offers flexibility in learning strengths. So, here the study states the following research questions.

What is the level of the learning styles of the natural science in Mathematics?

The question used to determine the level of the learning styles of the natural science preparatory school students. To analyze this research questions the following statistical tests were used. Frequency, mean, and standard deviation based on each items in different learning styles from participant's questionnaire ranged from strongly agree to strongly

disagree. Then numerical values that assigned from 5 to 1 were assigned respectively for positive statement and the opposite for negative items.

Then, each respondent on learning styles items expressed in number ranging from 1 up to 5 and their scores are calculated by their numerical number to the number of participants than add all the result then divided by the number of all participant mean and SD calculated by adding those numerical values assigned to each statement. Then, the respondent learning styles scores were calculated by adding those numerical value assigned to the responses of he or she gives to 35 items on its component (auditory, collaborative, independent, visual and dependent) were calculated.

In the table below is the table indicating the descriptive statistics of the students in auditory, Collaborative, Independent, Visual and Dependent learning styles.

Table 4. The Descriptive Statistics in learning style and it components variables in the study.

Types of Learning style	N	M	SD	df	t	P
Auditory Learning	308	3.2817	.61080	307	-1342.340	.000
Collaborative Learning	308	3.7890	.76490	307	-1060.274	.000
Independent Learning	308	3.6522	.69887	307	-1163.882	.000
Visual Learning Style	308	3.4616	.72770	307	-1122.359	.000
Dependent Learning St	308	3.3752	.62997	307	-1298.882	.000

Table 4 shows that students with different types learning style from the collected data considering the auditory, collaborative, independent, visual and dependent learning style component items in descriptive statistics value is listed and describe by one sample statistics. Here their mean comparison show that especially collaborative learning style learners be high achiever but al the other type of learners is medium learner in mathematics and correlate positive normality to the ranged score. The mean numerical value for each style from the participants response in two decimal places in averages (M=3.28, M=3.79, M=3.65, M=3.46 and M=3.37) respectively. From this mean variation student high positive degree towards mathematics in collaborative learning style in

mathematics and there is a significant difference among student variable in the learning style component. Since it p-value is less than 0.05.

As indicated they have less average in auditory learning style than all the others, collaborative, independent, visual and dependent, because of the mean value were above three for each variable. From the table 4 we can conclude that students had best and more in collaborative learning style of mathematics to the rest of each learning style. Jamil (2001) indicates that also this is by cited Northatta Mohd ,Tengku Farah Petri Tenguk Mahmood ,Mohd Nazriismail (2011), in the international journal of Academic research, student's level of variable in the scale ranging from [1.00 up to 2.33] low learners, from (2.33 up to 3.36] medium learners and the rest all from (3.67 up to 5.00] high learners data can be coded with these three significant figures and on similar approach table 4 Collaborative learners (M=3.79) are high learner and all the rest are medium learner with positive intentions.

The learning styles as the accumulative effects in its components towards mathematics. It is very important for student academic achievement when uses the relevant learning style with best theories. The majority of the participants are medium learners which are coinciding to the achievement test scores. From the table above student in the collaborative learning style is widely dispersed in their score than all the rest and they are medium learner. Because it $SD=.76490$ indicate that the greatest of all the other SD value. Learning styles encompass a series of the theories on systematic suggestions based on the individual's differences .A core concept is that individuals differ in how students learn. The idea is very old and influences education during different periods. The use of learning styles in education recommend that teachers assess the learning styles of their students and adapt their classroom methods to best fit each student's learning style.

From the items in the study, level of the students in learning style is 88.57% positively react to the items and all the others 11.43% of the student have negatively react to the mentioned learning style given items addressing their mathematics intention and their respective mean and standard deviation of natural Science students in the school. The

above five different type of learning style considered in this study from their respective items to the positive normality to the indicated percentage. The result above in the table is inconsistency of the findings in Perker (2005) and Peker, Mirasyedilogul and Yelin, (2003) is cited by Murat Peker Afyon Kocatepe Universitesi, Afyonkarabisar (2008). From his citation about Peker finding each learning style dependent on student achievement not uniformly. Student learning style towards mathematics achievement accommodates with difference. According to Murat student learning style had positive effects on students' achievement. But here from one sample t-test result learning style had negative effect on their mathematics achievement.

The researcher used one way ANOVA with .05 significant levels in the analysis of his data. And his study revealed that there is a significant difference in mathematics about learning style and anxiety among various learning style. This shows that the participants in the study had all four learning styles in different percentages. The difference is in favor of convergent learners. Similarly here in the study the collaborative learners are in favor and the highest average value than all the other learning style in mathematics.

4.4. Students Attitude, Motivation and Anxiety in Mathematics.

The attitude, motivation and anxiety of the students obtained from the Likert scale which contains 22, 10 and 11 questions respectively and the response of the students checked for normality and it is possible to use the parametric tests.

What are the levels of the natural science student's anxiety, motivation, and attitude in Mathematics?

The three variable states in the title above and these variables will discuss in the third research question. In order to analyze the questions written above by Mean and SD were used to determine their levels of student's motivation, anxiety and attitude and its component and used tables for indicating the descriptive statistics. Below is the table indicating the descriptive statistics of the students in motivation, anxiety and attitude and its components.

Table 5: Mean and Standard Deviation of Attitude, Motivation and Anxiety in Mathematics.

Variables	N	M	SD	df	t	p
1.Attitude	308	3.54	.49	307	126.12	.000
• Enjoyment	308	3.64	.68	307	92.93	
• Confidence	308	3.57	.74	307	84.78	
• Usefulness	308	3.39	.50	307	118.27	
2 .Anxiety	308	3.23	.53	307	105.51	
3 .Motivation	308	3.69	.63	307	102.91	

Here in the table 5 indicates that the findings obtained by making statistics are given the observation mean and SD. When table 5 is examined, it can be seen that the arithmetic mean of the motivation variable learners score is (M=3.69) best .Anxiety variable from participant intention also mathematics learners score (M= 3.23) is the least. The table also shows that the student's attitude in terms of Enjoyment, Confidence and Usefulness relatively their average values M=3.54, M=3.64, M=3.57 & M=3.39 respectively. As indicated here the statistical description shows in each variable they have positive attitude towards learning mathematics and its usefulness, their enjoyment and confidence, motivation and anxiety, because of its average score of variables. From the table 5 above one can conclude that students had higher average in motivation variable than all the others in terms of their respective items in mathematics. The analysis of the data that revealed to the significant number of the preparatory school student attitude becomes less in learning mathematics.

Here when I observe the level of students on attitude, anxiety, motivation and mathematics achievement of students in the special zone of the Oromia regional state surrounding Addis Ababa preparatory school were medium achiever which is nearly and above the average value 39.2 and relatively good result on the test and 50% promotion policy documents. Even if students have medium score and they have positive attitude towards Enjoyment of mathematics, Confidence and Usefulness, and motivation and anxiety. But here it is possible to conclude that having positive attitudes towards these

variables not led to student's achievement in mathematics in line to students have highly positive on motivation variable of mathematics.

Nowadays our government gives emphases on Science and Technology as mathematics a big and current issue of the education sector as long as running technology in the 70 % with 30% distribution for University entrant from the preparatory school. This findings is supported by (Nyala, JI, 2008) and ICDR, 2001.

This finding was in agreement with the finding cited by Orton and Wain (1994) and ICDR, (1998) suggest that students' acquiring knowledge. From the researcher findings on student attitude towards student knowledge acquisition relate to their attitude in mathematics education. Learners do in mathematics for better achievement as the subject and further study as a field in their awareness and knowing the usefulness of the subject. So this is not encourages students to develop positive attitude. The study investigates the effect of anxiety on students' mathematics learning and their motivation for achievement. The student achievement table 3 that appended because of its length.

The instrument used to measure achievement test in mathematics and requested anxiety items scale. In the enjoyment item analysis 14.3% of the students have not positively enjoyed towards mathematics. And almost all the participants that are 85.7% of the student have positive react to enjoyment items in mathematics, whereas few students are considered as positively react to confidence items towards mathematics. More over 57.14% of the student had positively awareness for usefulness of mathematics in their future life.72.72% of the student has positively anxiety of learning mathematics. Whereas almost all students have positive normality to motivation variable and one of the components in attitude called confidence. This result comes from the calculation of respondent items numerical in Appendix A. According to Orton and Wain (1994) researcher states that student attitude and mathematics achievement is negatively include to the normality mark indicate in this study to achievement, moreover this is also in student anxiety in mathematics. So, their findings are inconsistence to the current study.

4.5 . Mathematics Achievement, Learning style, Anxiety, Motivation and Attitude in terms of Sex, Achievers Level, grade level, school and family background.

Here the fourth research question described below is compared with some categories observe the difference between students characteristics and students achievement at each variables.

Is there a significance difference of mathematics achievement, learning style, anxiety, motivation and attitude with respect to sex, grade level, achievers level, school, family income, family education and family size?

In order to analyze the research question stated above, various techniques of analysis methods were used. Some of the methods are descriptive statistics, Independent sample t test, One -Way ANOVA and Tukey test.

4.5.1 Sex

The study addressed on the given sample size from all population of female and male students and the analysis was made based on the respondent achievement test scores which were obtained and most of the data were analysed by using table by SPSS 15.0 and follows as per the objectives of the study. From the participant in this study from previous table 33.8% (104) are female and 66.2 %(204) are also male students. So, the first step was to check whether there were significant differences or not in the attitude and its components, anxiety, Motivation and Learning style and its component in mathematics with respect to sex. Table 6 showed the descriptive statistics and the independent sample t-test for achievement in mathematics and its components with respect to sex.

A. Achievement with respect to sex.

The table below is the descriptive statistics and an independent t-test on student's mathematics achievement with respect to sex.

Table 6. Achievement of the students with respect to Sex.

Variable	Sex	n	M	SD	df	t	P
Achievement Test	Female	104	48.11	16.386	306	-1.774	.077
	Male	204	51.75	17.416			
	Total	308	50.52	17.16			

The achievers score in the table 6 above showed descriptive statistics with respect to sex variation in the study and from the table (M=51.75) and (M=48.11) for male and female average score respectively. Even though male's participants are better scorers than female's from this descriptive statistics comparisons an independent t-test the p value is more than .05 so there is no statistical significance difference between male student and female student on the achievement test. This findings is consistence to the result of studies conducted by Capa and Cil (2000) showed that no statistically significant difference in the individual achievement score in mathematics in terms of sex and attitude of the teachers cited by Mulugeta (2014) iSER. This findings also consistence of the findings of Mokahtar (2000) found that there was no significant difference in mean mathematics achievement between males and females student.

This result deviate from the researches Fennema (1974) as cited by Habtemu (1996). This shows that there is a significance variation in sex difference among in the grade level and within the grade level. 71.75% of the student are below the minimum standard score boundary which is set by Ministry of Education. So this results consistence with The ICDR, 2000, Fennema and Petersons findings. Besides to this, the analysis states that about 75% of the students were found to be below the minimum standard required to be promoted to the next grade level.

Nyala,(2008) states that the mean numerical value for all categories male or female of respondents was above three, and then there is a positive attitude On Usefulness of Mathematics, Confidence in Learning Mathematics and Motivation in learning mathematics. This study was inconsistent with the study of Fennema and Coper (1982) and study of Issak (2002) found that there is no significance difference between male and

female. This finding is consistent to the findings of Femmema (1985) male better performed than females, when task involved the cognitive skill used mathematics. This also supported by Moreno and Mayer (1999) and also according to Patterson et al., (2003) male have a more positive attitude towards than female's students.

B. Learning style and it component with respect to Sex

The table below is the descriptive statistics on Learning style and its component with the independent sample t-test which compares their mean difference with respect to Sex.

Table7. The Learning Style and its Components with respect to sex

Variable	Sex	n	M	SD	df	t	p
Auditory	Female	104	3.17	.482	306	-2.394	.017
	Male	204	3.34	.660			
Collaborative	Female	104	3.81	.741	306	.306	.760
	Male	204	3.78	.778			
Independent	Female	104	3.49	.701	306	-2.825	.005
	Male	204	3.73	.686			
Visual	Female	104	3.32	.703	306	-2.534	.012
	Male	204	3.54	.730			
Dependent	Female	104	3.3173	.639	306	-1.153	.250
	Male	204	3.41	.625			
Learning Styles	Female	104	3.42	.488	306	-2.433	.016
	Male	204	3.56	.462			
	Total	308	3.51	.475			

From table 7 above there are different p-value for each component of learning style and learning styles variables with respect to sex variations. It is also supported by descriptive statistics. Here the result shows that there is strongly significant difference between male and female student in the requested items average M=3.34 and M=3.49 male and female respectively for auditory learning style. Average M=3.73 and M=3.17 male and female respectively for independent learning style. Average M=3.54 and M=3.32 male and female respectively for visual learning style and M=3.56 and M=3.42 respectively for learning style in combined and for t-value auditory -2.394, Independent - 2.825, visual - 2.534 and learning style -2.433. From the table mean for collaborative learning style female are more score achiever than male. And there is greater p value than .05; it shows

there is no significance difference between female and male in student learning style. There are a significant difference between male and female student in auditory learning style, Independent learning style ,Visual learning style and Learning style in combined form .Since their p-value is less than .05.Whereas Collaborative and Dependent learning style p-values are more than .05 that is .760 and .250 respectively. There is no significant difference between male and female student in these two components.

In general the p value is equal to .016 for learning style in combined which is significant difference between female and male student learning style in mathematics. This findings are inconsistence to the findings shows from Capri and Celikkaleli (2008),Akkaya (2009) and Hussain et al., (2011) is cited by Mulugeta (2014) iSER, and his findings females have a more positive attitude towards Mathematics than male .

This table represents the group statistics results of the independent-samples t-test on the achievement of mathematics. From table 6 it is possible to see that the mean value of male (51.75) on achievement test is greater than that of female (M=48.11) students. Similarly the mean value of male student's for each Auditory, Independent, Visual and Learning style in combined in mathematics is greater than that of female student's style at each component. The findings are inconsistence of Chaudhry (2004) and he states that in the learning style and student academic achievement relate no impact each other. He concluded that there was no significant difference found in the learning style performance of male and female students.

C. Attitude , Anxiety and Motivation with respect to Sex

The table below is the descriptive statistics of the student's response of the attitude, motivation and anxiety scale and analysed using the independent t-test.

Table 8. The descriptive statistics result and independent significant difference between Attitude and its component, Anxiety and motivation with respect to Sex.

Variable	Sex	N	M	SD	df	t	P
Attitude	Female	104	3.4254	.40347	258.942	-3.177	.002
	Male	204	3.5967	.52360			
• Enjoyment	Female	104	3.54	.572	254.696	-1.999	.047
	Male	204	3.69	.726			
• confidence	Female	104	3.46	.633	249.917	-2.186	.030
	Male	204	3.64	.785			
• Usefulness	Female	104	3.27	.567	306	-3.046	.003
	Male	204	3.46	.458			
Anxiety	Female	104	3.1503	.52610	306	-1.782	.076
	Male	204	3.2652	.53913			
Motivation	Female	104	3.6413	.61306	306	-.942	.347
	Male	204	3.7127	.63714			

From table 8 there is difference in descriptive statistics of male and female students in their score on attitude items $M=3.5967$ and $M=3.4252$, Enjoyment $M=3.69$ and $M=3.54$ Confidence $M=3.64$ and $M=3.46$ Usefulness $M=3.46$ and $M=3.27$, Anxiety $M=3.2652$ and $M=3.15$ and Motivation $M=3.71$ and $M=3.64$ respectively. Nyala, J.(2008) **states that** the mean numerical value for mentioned above categories with sex variations male or female respondents was above three components, then there is a positive attitude on usefulness of mathematics, Confidence in learning mathematics and motivation in learning mathematics.

And again this is supported by the t-test result except motivation and anxiety; all the other p-values were less than 0.05. So, there is a significant difference between male and female student of natural science preparatory school student with related variable. Attitude and it component like enjoyment, confidence and usefulness in learning mathematics had negative t-values, for instance attitude $t(258.942)=-3.177$ in terms of (,enjoyment $(254.696) = -1.999$,confidence $t(249.917) = -2.186$,usefulness $(306)=-3.046$,anxiety $t(306)=-1.782$ and motivation $t(306) = -.942$). From the entire variable here in the table male student are better or more scorer than female student. This is also shown that in an independent t-test negative value. There is also significant difference

between female and male student in the variable mentioned above in the table 8, except Anxiety and motivation, because their p-value are less than .05

The above table shows that sex and the mentioned variable is a significant difference on the variable like attitude and its component. But not in motivation and anxiety there is no statistical significant variable. In student average scores, males had positive attitudes towards mathematics (3.59) and females too ($M = 3.42$). These difference was significant for $t (-3.177)$ value and $p = .002$ but it represented a small size effect negatively. This finding is consistence of the findings on various studies by Capa and Cil (2000) and deviate from the findings of Simsek (2005) states that there is no significance different among the indicated variables towards mathematics in terms of sex, according to Mulugeta (2014), iSER.

The findings of the study consistent with the findings of the researcher Peker and Halate (2008) showed that there was not a significance difference on sex with respect to anxiety. But this is deviate from the findings of Fish and Fraser (2001) indicates that females have more anxiety than males.

The relationship between gender and mathematics anxiety has also been studied extensively; but findings have not been consistent. There are many studies that have found significantly greater levels of mathematics anxiety in females than males Wigfield A, Meece (1988) states that there are no gender differences in mathematics anxiety. Chiu L, Henry LL: (1990) states that results regarding gender and mathematics anxiety are parallel to their achievement. According to Rexses (1995) states that who did not detect any significant gender differences in mathematics anxiety.

Gierl and Bisanz (1995) also states that there are not find any differences between mathematics anxiety scores of male and female students. Sarason (1980) describe that anxiety as a conditioned response to perceived threading stimulus which could be learned. The idea that anxiety may interface with a student ability to demonstrated what they have learned is not new. Anxiety can also interface with learning in that anxious

students are more easily distracted by irrelevant or incidental aspect of the task at hand. Anxiety plays significant role in students learning and academic performance (Tobias, 1979) even though there is no significant difference between sex variation especially in test anxiety.

One of the variable in this study is students motivation in mathematics, as shown in the table above there is no a significance difference between female and male student. Since its p-value greater than .05. Male and female student are significantly different awareness to usefulness of leaning mathematics. It indicates to the p-value is less than .05 and this shows that there is a significance difference between male and female student in their confidence of learning mathematics. Male students are more achiever when they compare to female student and all the other component of attitude that is medium. Male and female student are strongly significant to usefulness of learning mathematics learning. It indicates to the mean value is less than .05. The result is consistent to the researchers on Student mathematical attitude, confidence using comparisons of girls and boys result.

Pehkonen, (1997) states that boys were more interested in mathematics test and score better than girls and have more confidence in themselves than girl. Hyde et al., (1990) states that boys scored standard deviation is higher than girls scored in mathematics. It is also true here regardless of motivation Fox and others, (1994) concluded that girls have lower motivation than boys. They further state that lack of confident has been cited as a reason inhibiting the presence of many females in education.

4.5.2 Achievers level

Here under this title the study explain the division of the various achiever level namely low achievers(student scores below 50%), medium achievers (scores between 50% and 79%) inclusively and high achievers(score more than equal to 80%) on the achievement test which relates to each of the variable below and the second step was to check whether there were a significance differences or not in the student achievement, learning style and

its component, attitude and its component, anxiety and motivation in mathematics with respect to achievers level.

A. Student Mathematics Achievement with respect to achiever level.

The table below is the descriptive statistics of the achievement of the students with respect to the achievers level and analysed by using F-test.

Table 9. The descriptive Statistics and one –way ANOVA result on mathematics achievement with respect to achievers level

Variable	Achievers Level	n	M	SD	F	P
Achievement Test	low	159	37.41	8.048	476.787	.000
	medium	131	61.22	9.251		
	high	18	88.50	5.339		
	Total	308	50.52	17.136		

The table 9 shows that the analysis for the achievement test with respect to the various achievers level and the above result shows there is a significant difference in achievement with respect to achievers level in mathematics and its p value is less than .001. The result as shown in table that there above is significant different on students achievement p is less than .05 and the calculated F-test value 476.787 indicated that difference in the achievement of students with respect to achievers levels, then the next step is to assess which achiever levels made more significance. This finding is consistent with the Clark Thayer (1987) found that higher achievement related to student learning style across the subject matter. That is identified to determine the strength for academic achievement Beaudry and Klavas (1989).

Since there is a significant difference in the achievement of the students with respect to achievers levels, then the next step is to assess which achievers levels made more significant and this can be analysed by the Tukey test for find these paired comparisons Tukey HSD test was used for achievement in mathematics is given by table 10.

Table 10. Tukey test for paired achievers levels of mathematics student achievement.

(I) Achievers Level	(J) Achievers Level	MD (I-J)	SE	P
Low achievers	Medium	-23.813(*)	.999	.000
	High	-51.091(*)	2.105	.000
Medium achievers	Low	23.813(*)	.999	.000
	High	-27.279(*)	2.127	.000
High achievers	Low	51.091(*)	2.105	.000
	Medium	27.279(*)	2.127	.000

* The mean difference is significant at the .05 level

From the table 10 of achievers level variable, the lower achiever of mathematics made more significant difference with the higher and medium level of the achievers. And also the medium level of achiever of mathematics made more significant difference with the higher and lower level of the achievers. And also the higher achievers of mathematics made more significant difference with the lower and medium level of the achievers. The medium achievers mean ($M=61.22$) were significantly high achievement in mathematics than low achievers. High achievers in (I) achiever level are more significant to low achievers in (J) achievers level.

Since their mean difference is 51.091^* and its p-value equal to .000. Table above shown achievers Scores in different level from descriptive statistics and significance difference in a one way ANOVA results for the different preparatory school including mean and SD. From the above table we can understand majority of the student are below the cut of mark 51.65% (159 out of 308 participants) for their achievement scores. This is not from above table but it is from table 1 in this chapter.

The medium achievers are very scattered since their $SD=9.25$ which is the greatest of all and a wider achievers gap in their score variation and narrower and they are not far apart of these score within the group. From the table above 308 participants students information 159 (51.6%) of them were on the low achievers level in mathematics, 131(42.5%) of them were also on the medium achievers level on the test score and the

rest 18(5.8%) of the respondents were assigned for high achievers. Approximately from the given proportion, 10.2% of the student is high achievers, 51.6% of the student's also medium achievers and the rest 42.5% of the sample is low achievers. In the requested items scaling to grade 12 is 61.7% of the student score above the promoting policy of MOE.

But 38.2 % of the student is below the cut off promotion policy and below the standard scales in grade 11 to pass the next grade and in grade 12. Similarly on the following table below the student achievement level increases the total number of the student in the level more or less decreases. From F-test there is a significance difference between achievers level and achievement score result and its P value is .000 that is less than .001. Both low and medium achievers earn higher success on standardized achievement and attitude tests when they are taught with in earn of their learning style. Thus Chuah Choang Cheg (1989) states that learning style is not only for their success but also important for individual in academic settings.

B. Learning style and its component in mathematics with respect to achievers level.

Here the study explain about learning style and its components such as Auditory, Collaborative, Independent, Visual and dependent with respect to achievers levels . The table below is the descriptive statistics of the learning style and its component on various achievers level of the students with respect to different achievers level and analyzed by using F-test.

Table 11. Descriptive statistics value in learning style with respect to achievers level and an F-test results shows their significance.

Variables	Achievers level	N	M	SD	F	P
Learning Style	low	159	3.51	.466	.028	.972
	medium	131	3.52	.494		
	high	18	3.53	.438		
• Auditory	low	159	3.2288	.60346	1.471	.231
	medium	131	3.3254	.62763		
	high	18	3.4306	.52549		
	Total	308	3.2817	.61080		
• Collaborative	low	159	3.7872	.74415	.004	.996
	medium	131	3.7926	.79073		
	high	18	3.7778	.79828		
	Total	308	3.7890	.76490		
• Independent	low	159	3.6619	.68502	.063	.939
	medium	131	3.6365	.71697		
	high	18	3.6806	.72409		
	Total	308	3.6522	.69887		
• Visual	low	159	3.4549	.68068	.018	.982
	medium	131	3.4707	.79836		
	high	18	3.4537	.61783		
	Total	308	3.4616	.72770		
• Dependent	low	159	3.4016	.60442	.310	.734
	medium	131	3.3511	.65352		
	high	18	3.3175	.70081		
	Total	308	3.3752	.62997		

In the table 11 above in general, the descriptive statistics values for learning style with its components in the requested scales ($M=3.51$, $M=3.52$, $M=3.53$) for low, medium and high achievers respectively. So, high achiever students are best achiever in learning style of mathematics than low or medium achievers. Even though they perform dependently all the p-value were greater than .05. This shows that there is no statistically significant difference among the achievers level regarding learning style component. There is no descriptive difference among achiever level meaning each achievers level of student have his/her own learning style for better achievement.

Here from the ANOVA result in the table above show there is no significant difference on the learning style considering achievers level. In fact the variables were seen in the average score towards positive normality variations. So this variable is not a great impact on student achievers levels variation. There is no distinction among each components of learning style. This may every individual learning different. The F-value for Auditory Learning style is $F=1.471$ with $p=.231$ and Mean for achiever level $M=3.2288$, $M=3.3254$ and $M=3.4306$ for low, Medium and high respectively. In fact high level of achievers is best scorer in auditory learning style than the others. The F-value for Collaborative Learning style is $F=.004$ with $p=.996$ and Mean for achiever level $M=3.7872$, $M=3.7972$ and $M=3.7778$ for low, Medium and high respectively. Similarly medium achievers are best score in collaborative learning style than the other two from this descriptive statistics.

The F-value for Independent Learning style is $F=.063$ with $p=.939$ and Mean for achiever level $M=3.6619$, $M=3.6365$ and $M=3.6806$ for low, Medium and high respectively. More over high achievers are best score in independent learning style than the other two from this descriptive statistics. The F-value for Visual Learning style is $F=.018$ with $p=.982$ and Mean for achiever level $M=3.4549$, $M=3.4707$ and $M=3.4537$ for low, Medium and high **respectively**. And also medium achievers are best score in Visual learning style than the other two from this descriptive statistics.

The F-value for dependent Learning style is $F=.310$ with $p=.734$ and mean for achiever level ($M=3.4016$, $M=3.3511$ and $M=3.3175$) for low, medium and high respectively. Where as low achievers are best score in dependent learning style than the other two from this descriptive statistics.

. In generally the researcher findings consistency of the NCTM (1989) and stating new educational theories in order to understand and help students overcome their challenges in mathematics at these grade level. However, the results also deviate from the findings of Peker (2005) and Peker, Mirasyediloglu and Yalin, (2003), there is variation in learning style of student in mathematics. We hope that learning style constructed according to different learning styles will improve mathematics achievement among students. The

one-way ANOVA results on the learning style at the preparatory school towards mathematics which is not statistically significant difference among all component of learning styles and different learning style will improve mathematics achievement and their success depending on learning style. The result is inconsistency of the findings on Perker (2005) and Peker ,Mirasyedioglu and Yalin (2003).The participant when requested to indicate whether or not they use different learning styles for better achievement and whether they understand or not, the detail definitions of learning styles and various types of learning styles.

C. Attitude, Anxiety and Motivation with respect to achievers level.

Here the study explains about the attitude and its component, anxiety and motivation of the student with respect to various achievers level. The table below shows the descriptive statistics of the student's attitude and its component, anxiety, and their motivation in mathematics with respect to the achievers level and analyzed by using F-test and discussed as follows.

Table 12. Significance difference on descriptive statistics and a one way ANOVA results with respect to the achievers level on Attitude, anxiety and motivation.

Variable	achievers Level	N	M	SD	F	p
Attitude	low	159	3.5268	.47275	2.643	.073
	medium	131	3.5853	.51086		
	high	18	3.3076	.48120		
	Total	308	3.5388	.49243		
 Enjoyment	low	159	3.6595	.63458	1.691	.186
	medium	131	3.6618	.72890		
	high	18	3.3571	.68468		
	Total	308	3.6428	.68063		
 confidence	low	159	3.5291	.72713	4.631	.010
	medium	131	3.6899	.74845		
	high	18	3.1736	.64617		
	Total	308	3.5767	.74068		
 Usefulness	low	159	3.3890	.42854	.022	.978
	medium	131	3.4013	.56760		
	high	18	3.3889	.64413		
	Total	308	3.3942	.50394		
Anxiety	low	159	3.1698	.56783	3.310	.038
	medium	131	3.3144	.47443		
	high	18	3.0859	.61061		
	Total	308	3.2264	.53667		
Motivation	low	159	3.6365	.61525	1.812	.165
	medium	131	3.7221	.64965		
	high	18	3.9056	.56201		
	Total	308	3.6886	.62902		

From table 12, since all the p-value was greater than 0.05 except student anxiety and their confidence in mathematics due to achievers level were no statistically significant difference among achievers level except the above two variables. For attitude the p-value .073 and F=2.643 for low achiever M=3.5268, for medium achievers M=3.5853 and high achievers M=3.3076. So, medium achievers become positive attitude towards mathematics than the other achievers levels.

For Enjoyment the p-value .186 and F=1.691 for low achiever mean =3.6595, for medium achievers M=3.6618 and high achievers M=3.3571. So, medium achievers

become higher positive reaction to enjoyment towards mathematics than the other levels. For confidence the p- value .010 and $F=4.631$ for low achiever $M=3.5291$, for medium achievers $M=3.6899$ and high achievers $M=3.1736$.So, medium achievers are highest confidence towards mathematics than the other levels. For Usefulness the p- value .978 and $F=.022$ for low achiever $M=3.3890$, for medium achievers $M=3.4013$ and high achievers $M=3.3889$.So, medium achievers have positive attitude towards mathematics than the other levels. For anxiety the p- value .038 and $F=3.310$ for low achiever $M=3.1698$, for medium achievers $M=3.3144$ and high achievers $M=3.0859$.So, medium achievers are highest anxiety towards mathematics than the other levels. For motivation the p- value .165 and $F=1.812$ for low achiever $M=3.6365$, for medium achievers $M=3.7221$ and high achievers $M=3.9056$. So, high achievers have positive towards mathematics than the other levels.

Studies conducted by Ameen, Guffey and Jackson (2002) on student anxiety towards and its findings of the study consistent with findings to this study and supported by Fish and Fraser (2001). Since there is a significant difference in the student anxiety and confidence with respect to the achievers levels, then the next step is to asses which achievers levels made more significant and this can be analyzed by the Tukey test. So, find their paired comparisons. Tukey HSD test was used and the test for the paired levels of anxiety and confidence in learning mathematics.

Table 13. Tukey Test for the paired achievers level of mathematics in anxiety and confidence of student in mathematics.

Dependent Variable	(I)Achievers Level	(J)Achievers Level	MD (I-J)	SE	P
Confidence	low	medium	-.161	.086	.152
		High	.355	.182	.126
	medium	Low	.161	.086	.152
		High	.516(*)	.184	.015
	high	low achievers	-.355	.182	.126
		medium	-.516(*)	.184	.015
Anxiety	low	medium	-.145	.063	.057
		high achievers	.084	.132	.802
	medium	low achievers	.145	.063	.057
		high achievers	.229	.134	.204
	high	low achievers	-.084	.132	.802
		medium	-.229	.134	.204

* The mean difference is significant at the .05 level.

From table 13 the Tukey test result on achievers variations, the medium achievers in I-level of mathematics student made more significant differences with the higher achievers level. Since its mean difference is .516(*) for SE=.184 in students attitudes component namely confidence. But there is no significant difference between high achievers and low achievers of the mathematics student in Confidence of learning mathematics. The medium achievers (M=3.6899) significantly were more confidence in learning mathematics than the high achiever (M=3.1736) and low achiever (M=3.5291). For the variable anxiety there is significant difference among the achievers level. But this difference is not visible in the wider range to each other. These made more significant difference with other variables in mathematics anxiety. High achievers of mathematics student made also more significant difference with medium and lower achievers in mathematics in anxiety in the above two consecutive table.

This findings is consistent to student who have high level of positive attitude in mathematics will succeed high level of achievement and strong academic status Took and Lindstrom (1998). According to Education Matters (2008) student commitment in mathematics plays a key role in the acquisition of mathematics skills, student motivation to learn mathematics, their confidence in their ability to succeed mathematics.

4.5.3 Grade level

Here the study explain about the learning style and its component, and attitude and its component, anxiety and motivation of the student with respect to at different school student grade level .The table below shows the descriptive statistics and an independent sample t-test which is used in the study and discussed as follows.

A. Learning Style with respect to grade level

The table below is the descriptive statistics of the learning style and its component with respect to the student grade level and analyzed by using an independent sample t-test result.

Table 14. Presents mean and Standard deviation of the student learning style and its component with respect to grade level.

Variable	Grade	N	M	SD	t	p
Learning Style	11	221	3.49	.500	-1.237	.218
	12	87	3.56	.405		
Auditory	11	221	3.25	.631	-1.635	.103
	12	87	3.37	.550		
Collaborative	11	221	3.80	.784	.243	.808
	12	87	3.77	.719		
Independent	11	221	3.68	.736	.926	.355
	12	87	3.59	.594		
Visual	11	221	3.42	.787	-1.734	.084
	12	87	3.56	.542		
Dependent	11	221	3.32	.638	-2.297	.022
	12	87	3.51	.593		

From sample participants in the study expressed before and includes with this figure 221(70%) from grade 11 and 87(30%) from grade 12. In the above table student's learning style treated in the variable like auditory M=3.37. Learning style in combined M=3.56. For visual M= 3.56 and dependent M=3.51 in grade 12 student better scores in the requested items than grade 11 in auditory style M=3.25. Visual learning style M= 3.42 and dependent M=3.32. But for collaborative and dependent grade 11 student has

relatively better in their response average score than grade 12 in descriptive value in the table above $M=3.80$ and 3.77 and $M=3.68$ and $M=3.59$ respectively at both grade level.

This table represents the group statistics results of the independent-samples t-tests and The Levene's Test for Equality of Variances Appendix A. The achievement of mathematic had a t-statistics 0.535 with a significance value of 0.593 . Because $0.593 > .05$. Similarly we can observe that the Levene's Test for Equality of Variances results on learning style, auditory, collaborative, Independent, Visual and dependent in learning mathematics.

So we can observe that $t = -1.237, -1.635, 1.243, .926, -1.734$ and -2.297 respectively and all the p value is greater than $.05$ except dependent learning style. As indicated data from the table we can conclude that $t=-1.237, df =306, P=.218$ of learning style in mathematics was not statistically significant between the grade levels. Since $P>0.05$. Similarly there is no significance difference among auditory, collaborative, independent and visual leaning styles. But there is a significant difference between grade 11 and 12 in dependent learning style types .Since p value is less than $.05$,for $t=-2.297$. Grade 12 students are more positive than that of grade 11 in learning style in general. This may be students are coming with new effort for the entrance examination period.

This may be students are coming with new effort and they are they are happy in the promoting of preparatory school from secondary high. But in testing whether there was any significant difference of grade 11 and 12 students in special zone of Oromia preparatory school student's achievement and learning style in mathematics, it is possible to conclude that there is no significance difference between grade 11 and 12 on student' learning style components except dependent learning style and mathematics achievement with respect to grade level.

This deviate from the researchers Fennema, (1974) as cited by Habtemu, (1996). This shows that there is a significant variation in sex difference among in the grade level and within the grade level 71.75% of the student is below the minimum standard. So this

results consistence with the ICDR, 2000, Fennema and Petersons findings. Besides to this, the analysis states that about 75% of the students were found to be below the minimum standard required to be promoted to the next grade level .this finding was the consistent with the finding of ICDR, 2000 Fennema and Peterson (1995).

B. Attitude, Motivation and Anxiety with respect to grade level.

Here the study focus on student attitude and its component, anxiety and motivation at the preparatory grade student at various grade levels and the table below is the descriptive statistics of the attitude and its component with respect to the student grade level and analyzed by using a an independent sample t-test result.

Table 15. Present about the descriptive statistics and the independent sample t-test on student attitude, anxiety and motivation variables.

Variable	Grade	N	M	SD	t	p
Attitude	11	221	3.59	.554	2.590	.010
	12	87	3.40	.600		
Enjoyment	11	221	3.75	.680	3.989	.000
	12	87	3.36	.807		
Confidence	11	221	3.71	.830	2.443	.015
	12	87	3.46	.760		
Usefulness	11	221	3.36	.591	-1.044	.297
	12	87	3.44	.623		
Anxiety	11	221	3.23	.598	.101	.920
	12	87	3.22	.655		
Motivation	11	221	3.76	.753	.722	.471
	12	87	3.69	.634		

From the table 15, it is possible to observe that there is a strong significant difference between grade levels on student attitude, more over one of the component of attitude call it, Enjoyment in learning mathematics between the grade level and this is also true for student confidence in mathematics related items response. Since this independent t-test all p-value is less than .05. This is from the above descriptive statistical value indicates (M= 3.59 and 3.40), (M=3.75 and 3.36), (M=3.71 and 3.46) respectively for grade 11 and 12.And their t value (2.590, 3.989 and 2.443) respectively at the p-value (.000, .000 and .015) respectively.

But for the remaining three variables like Usefulness, Anxiety and Motivation there is no significant difference between grade levels. Since their p value is greater than .05. On the other hand student's attitude in terms of confidence and enjoyment is significant difference between the grades. But one of the component here used to determine student attitude in terms of usefulness of learning mathematics be no significant difference between each grades .This table represents the group statistics results of the independent-samples t-tests and the result supported by the article ideas in the International Electronic Journal of Mathematics Education October (2008) significant difference in mathematics anxiety in different grade.

Grade 11 students have better positive attitude than grade12 student. There is no significant difference between grade 11 and 12 in the variable like anxiety and motivation. Including t-test values (2.590, 3.989, 2.443, .101 and .722) respectively. This finding is consistency to findings of Effandi and Normah (2009) student towards mathematics are very much related to their attitude and they negative attitudes need to be overcome. And also according to Education Matters (2008) student's commitment in mathematics refers to student motivation to learn mathematics, their confidence in their ability to succeed in mathematics. Context dependent way stands to alienate many students from mathematics.

Researchers concluded that positive attitude towards mathematics leads students towards success in mathematics achievement. Attempt to improve attitude towards mathematics at lower level provides base for higher studies. It also causes effect in achievement of mathematics at Secondary school Ma and Xu.2004).This study result also coincides did not find any significant difference in mathematics anxiety with respect to grade.

4.5.4 School

The respondents were taken from four governmental schools such as Sululta, Holeta ,Burayu ,and Sandafa preparatory schools. The respondents in these schools were 80 (26%), 100 (32.5%), 80(26%) and 48(15.6%) respectively.

A. Achievement with respect to school

The table below is the descriptive statistics on the student achievement with respect to various school and analyzed by using an F-test and the result discuss as follows.

Table 16. Achievement with respect to school difference on descriptive statistics and a one way ANOVA result in student score.

Variable	School	N	M	SD	F	P
Achievement	Sululta	80	54.29	18.778	4.143	.007
	Holeta	100	51.63	18.780		
	Burayu	80	49.43	14.477		
	Sandafa	48	43.77	12.439		
	Total	308	50.52	17.136		

From the table 16 of F –test of P-values less than .05, it can be concluded that there were significant differences in the four schools above in achievement of mathematics. So, there is a significant difference between schools with respect to the achievement. Since there is a significant difference in the student achievement with respect to the school, then the next step is to assess which schools achievement made more significant and this can be analyzed by the Tukey test. To find their paired comparisons Tukey HSD test was used and the test for the paired schools types for achievement in mathematics is given table 17.

Table 17. Tukey Test for the parried school types significance of mathematics.

(I) School name	(J) School name	MD (I-J)	SE	P
Sululta	Holeta	2.657	2.532	.720
	Burayu	4.863	2.669	.265
	Sandafa	10.517(*)	3.082	.004
Holeta	Sululta	-2.657	2.532	.720
	Burayu	2.205	2.532	.820
	Sandafa	7.859(*)	2.964	.042
Burayu	Sululta	-4.863	2.669	.265
	Holeta	-2.205	2.532	.820
	Sandafa	5.654	3.082	.259
Sandafa	Sululta	-10.517(*)	3.082	.004
	Holeta	-7.859(*)	2.964	.042
	Burayu	-5.654	3.082	.259

* The mean difference is significant at the .05 level

From table 17 of the achievement variable, the Sululta preparatory school student in mathematics achievement made more significant differences with the Sandafa for $MD=10.517(*)$ in their achievement. But there is no significant difference between Holeta, Burayu School in mathematics. More over Holeta preparatory school significantly different to Sandafa preparatory school in J achievers level ($MD=7.859(*)$) in the mathematics achievement. Sululta Preparatory School is one of the highest ($M=54.29$) achievement scores mean value from all the schools listed in the table above.

The uniqueness of the school may depends on the school age, academic staff quality, Organizational strength, students effectiveness on their work, Class participation, their economic background and student strength on learning mathematics. Moreover, the number of the student in the school and new academic staff and smooth working atmosphere, Students self-efforts considerable, and all the materials in the school are also new. They have not scattered score to the other school since their $SD=12.44$ which is less than all the other standard deviation.

From the result Sandafa preparatory school is the least scorer on the overall comparison on student Achievement Test in the study. Moreover, the Sandafa School students have higher anxiety and less motivated to learn mathematics in the school. The study is inconsistence to the findings of the Ethiopian first National Learning Assessment of grade 10 and 12 students, 2010 stated that 85.3% of grade 10 student and 42.3% of grade 12 students failed in mathematics.

B. Learning style and its component in school.

Here the study focus on student learning styles and its component, at the preparatory grade student in different schools and the table below is the descriptive statistics of the learning styles and its component with respect to school in mathematics achievement and analyzed by using a one way ANOVA result. The next step is to check whether there were significant differences or not in the learning style and its component in mathematics achievement with respect to school type.

Table 18. A One –Way ANOVA results on different type of learning styles and its combined effect and their descriptive statistical values and descriptive statistics.

Variable	School	N	M	SD	F	p
Learning Styles	Sululta	80	3.60	.389	1.386	.247
	Holeta	100	3.48	.433		
	Burayu	80	3.46	.584		
	Sandafa	48	3.51	.483		
	Total	308	3.51	.475		
Auditory	Sululta	80	3.35	.569	1.898	.130
	Holeta	100	3.31	.582		
	Burayu	80	3.29	.610		
	Sandafa	48	3.10	.715		
	Total	308	3.28	.611		
Collaborative	Sululta	80	3.88	.665	.924	.430
	Holeta	100	3.70	.702		
	Burayu	80	3.83	.856		
	Sandafa	48	3.75	.880		
	Total	308	3.79	.765		
Independent	Sululta	80	3.70	.586	1.397	.244
	Holeta	100	3.61	.638		
	Burayu	80	3.57	.819		
	Sandafa	48	3.81	.765		
	Total	308	3.65	.699		
Visual	Sululta	80	3.65	.549	2.463	.063
	Holeta	100	3.40	.694		
	Burayu	80	3.37	.872		
	Sandafa	48	3.43	.759		
	Total	308	3.46	.728		
Dependent	Sululta	80	3.43	.574	1.966	.119
	Holet	100	3.41	.575		
	Burayu	80	3.23	.770		
	Sandafa	48	3.46	.545		
	Total	308	3.38	.630		

From the table 18 of F-test of the p-values more than .05 and it can be concluded that there were no significant differences in the school type of mathematics in learning style and its component with that respect to the school difference towards mathematics. Even if see variation in student arithmetic mean of the descriptive statistics.

One of the schools namely Sululta preparatory school shows better performance in mathematics related items in the questionnaire about learning style. So their score in the school with learning style relative insignificant relations. The four preparatory school involved in this study have their own learning style. From the descriptive mean value in the requested items Sululta preparatory student score better in all the learning style than all the other schools except dependent learning style where as Sandafaa preparatory school score better in dependent learning style than all the other school student in the requested.

C. Attitude ,Anxiety and Motivation with respect to school

The table below is the descriptive statistics on the student attitude and its component, Anxiety and Motivation with respect various schools and analyzed by using an F-test. The next step was to check whether there were significant differences or not in the attitude, and its component, anxiety and motivation.

Table 19. Descriptive Statistics and one way ANOVA result on student attitude and its component, anxiety and motivation in various schools.

Variable	School	N	M	SD	Df	F	P
Attitude	Sululta	80	3.48	.546	3	.603	.613
	Holeta	100	3.54	.406	304		
	Burayu	80	3.58	.553			
	Sandafa	48	3.56	.461			
	Total	308	3.54	.492	307		
.Enjoyment	Sululta	80	3.53	.703	3	1.504	.213
	Holeta l	100	3.63	.621	304		
	Burayu	80	3.75	.760			
	Sandafa	48	3.69	.607			
	Total	308	3.64	.681	307		
.confidence	Sululta	80	3.51	.772	3	.340	.796
	Holeta	100	3.61	.636	304		
	Burayu	80	3.59	.821			
	Sandafa	48	3.59	.765			
	Total	308	3.58	.741	307		
.Usefulness	Sululta	80	3.41	.525	3	.095	.963
	Holeta	100	3.38	.528	304		
	Burayu	80	3.41	.513			
	Sandafa	48	3.38	.407			
	Total	308	3.39	.504	307		
Anxiety	Sululta	80	3.22	.565	3	.036	.991
	Holeta	100	3.23	.468	304		
	Burayu	80	3.24	.578			
	Sandafa	48	3.21	.566			
	Total	308	3.23	.537	307		
Motivation	Sululta	80	3.71	.505	3	3.337	.020
	Holeta	100	3.69	.560	304		
	Buraya	80	3.81	.695			
	Sandafa	48	3.45	.775			
	Total	308	3.69	.629	307		

From table 19 of the F-test of the p-values of the student attitude and its component, anxiety and student motivation, it can be concluded that there was only significant difference in the four school of mathematics student was motivation in mathematics. For the other variables such as attitude, Enjoyment, confidence, Usefulness, Anxiety in mathematics, there were no significance difference between the four schools.

The mean score of each schools namely Sululta, Holeta, Burayu and Sandafa (3.71, 3.69, 3.81 and 3.45) respectively in student Motivation from the requested items towards mathematics. This study finding is not consistence to the finding to conduct by Ameen, Guffey, and Jackson (2002) anxiety affect student character. This indicates significant difference in the variable about mathematics among school and analyzed by one way ANOVA with a Tukey test.

Since there is significance difference in the students with respect to the student motivation in mathematics at the schools, then the next step is to assess which school made more significant and analyzed by the Tukey test.

Table 20. Tukey Test for the school types on the motivation of the student in mathematics.

Dependent Variable	(I)School name	(J)School name	MD (I-J)	SE	P
Motivation	Sululta	Holeta	.01875	.09329	.997
		Burayu	-.10000	.09834	.740
		Sandafa	.25667	.11355	.110
	Holeta	Sululta	-.01875	.09329	.997
		Burayu	-.11875	.09329	.581
		Sandafa	.23792	.10921	.132
	Burayu	Sululta	.10000	.09834	.740
		Holeta	.11875	.09329	.581
		Sandafa	.35667(*)	.11355	.010
	Sandafa	Sululta	-.25667	.11355	.110
		Holeta	-.23792	.10921	.132
		Burayu	-.35667(*)	.11355	.010

* The mean difference is significant at the .05 level.

From table 20 of motivation variable, the Burayu School students in motivation variable made more significant difference with the Sandafa School. But there is no significant between Holeta and Sululta school student in motivation. Even if the Burayu school (M=3.81) were significantly highly motivated in learning mathematics than Holeta (M=3.71) and Sululta (M=3.69) in mathematics. The Burayu school student (M=3.81) were significantly high motivation in learning mathematics than Holeta (M=3.69), Sandafa (M=3.45) and Sululata (M=3.71) may this variable contribute for student successfulness in mathematics achievement. So, Student at the preparatory level had significant

difference in motivation of learning mathematics with respect to school from the comparison Tukey HSD test for paired school student motivations in mathematics.

4.5.5 Family size.

Here the study focus on student family size with student achievement, attitude and its component ,anxiety ,motivation ,learning style and its component very low (no brother or sister), low (1 to 2 brothers or sisters). Medium (3 to 5 brothers or sisters), high (6 to 8) and very high above 8 brothers or sisters) level for the preparatory grade student 18(5.8%), 86(27.6%), 144(46.8%), 35(11.4%) and 25 (8.1%) respectively in different schools in table 2. The table below is the descriptive statistics on family size with student achievement, attitude and its component, learning style and its component, anxiety and motivation and analyzed by using a one way ANOVA result. This figure from the appendix A and listed on different table from very low to very high for family ranging scale which is mentioned above.

A). Achievement of Student in mathematics with respect to the family size.

The table below is the descriptive statistics on the student mathematics achievement with respect to student family size and analyzed using an F-test.

Table 21.Descriptive statistics result and an F-test result difference on student achievement.

Variable	Family size	N	M	SD	F	P
Achievement Test	Very low	18	52.39	18.118	2.232	.066
	low	86	47.22	16.481		
	Average.	144	51.75	17.032		
	high	35	47.86	16.553		
	Very high	25	57.20	18.371		
	Total	308	50.52	17.136		

From the table 21 above shows that the mean score of student in mathematics achievement test or exam treats with student family background size relatively from very large family size to very low(small) in family members. Here I being compare the family members size have/haven't no impact to student mathematics achievement and it is

written in the table and descriptive statistical analysis value indicate their respective mean compare to the other level of student family background. For instance student come from vary large family score better than all the others $M=57.20$. This is from the result of the study not simply estimation. Especially student family size has not impact on student mathematics achievement. But there is not significant difference between student achievements with relate to their family size. Therefore, the Obtained mean score was a result of an independent t-test labeled $F=2.232$ in the study and compare to student achievement to family size. And there were greater p value than 0.05. So; there were no significant differences between the two variables. Here when I observe the level of student's family size and mathematics achievement, students in the Oromia special zone preparatory School were medium achiever which is above 50%. Even if students have such low score they have positive attitude towards usefulness of mathematics, have anxiety, motivation, and confidence enjoyment. This may be due to the government advertizing of different media on science and technology as mathematics a big issue of the education sector as long as addressing technology in the 70% with 30% allocation of each universities. Nyala, JI. (2008) also argue that students have a positive attitude.

B). Learning style and its component with respect to student family size.

Here the study focuses on student learning styles and its component in different schools with respect to family size. The table below is the descriptive statistics of the learning styles and its component with respect to student family size and analyzed by using by F-test.

Table 22. Descriptive statistics and one way ANOVA test result on family size and learning style components.

Variable	Family Size	N	M	SD	F	P
Learning Styles	Very low	18	3.45	.510	.471	.757
	Low	86	3.51	.435		
	Average	144	3.54	.467		
	High	35	3.44	.575		
	Very high	25	3.48	.500		
Auditory	Very low	18	3.33	.450	.751	.558
	Low	86	3.26	.700		
	Average	144	3.33	.596		
	High	35	3.16	.577		
	Very high	25	3.20	.509		
Collaborative	Very low	18	3.67	.695	.236	.918
	Low	86	3.84	.745		
	Average	144	3.78	.758		
	High	35	3.81	.861		
	Very high	25	3.75	.825		
Independent	Very low	18	3.66	.874	.952	.434
	Low	86	3.72	.725		
	Average	144	3.67	.637		
	High	35	3.58	.783		
	Very high	25	3.43	.696		
Visual	Very low	18	3.35	.571	.903	.462
	Low	86	3.42	.787		
	Average	144	3.48	.695		
	High	35	3.39	.839		
	Very high	25	3.69	.628		
Dependent	Very low	18	3.25	1.049	1.358	.249
	Low	86	3.32	.591		
	Average	144	3.46	.560		
	High	35	3.24	.723		
	Very high	25	3.34	.603		
	Total	308	3.38	.630		

The table above shows that the descriptive statistics of the learning styles and its component with respect to student family size from the data mean value of students for each learning style in mathematics requested scale varies from style to style. So, the F - test of each variable-value were greater than .05 so there were no significant difference

between learning style and its component with respect to different family size and no significant differences at all , since all the p-value is greater than 0.05 for each variable.

C). Attitude, Anxiety and Motivation of student in mathematics student with respect to family size.

The next step is to check whether there were significant differences or not in the attitude, enjoyment, confidence, usefulness, anxiety and motivation in mathematics education with respect to family size. The table below is the descriptive statistics for the variable on the title above and analyzed by using by F-test.

Table 23.Descriptive statistics on student related variable and the one way ANOVA result on family size of the student.

Variable	Size	N	M	SD	F	p
Attitude	Very low	18	3.45	.496	.402	.807
	low	86	3.59	.475		
	Average.	144	3.52	.512		
	high	35	3.53	.419		
	Very high	25	3.53	.551		
Enjoyment	Very low	18	3.46	.685	.638	.636
	low	86	3.72	.641		
	Average.	144	3.62	.708		
	high	35	3.67	.565		
	Very high	25	3.60	.806		
confidence	Very low	18	3.47	.567	.288	.886
	low	86	3.63	.771		
	Average.	144	3.58	.737		
	high	35	3.58	.700		
	Very high	25	3.49	.850		
Usefulness	Very low	18	3.42	.453	.591	.670
	low	86	3.42	.518		
	Average.	144	3.37	.482		
	high	35	3.33	.619		
	Very high	25	3.51	.450		
Anxiety	Very low	18	3.21	.537	.332	.856
	low	86	3.22	.544		
	Average.	144	3.23	.538		
	high	35	3.29	.567		
	Very high	25	3.13	.490		
Motivation	Very low	18	3.52	.601	.738	.566
	low	86	3.71	.654		
	Average.	144	3.67	.585		
	high	35	3.70	.742		
	Very high	25	3.84	.654		

From table 23 of F-result of the p-values above shows in the table, it can be concluded that there were no significance differences in the five family sizes with respect to student attitude and its component, anxiety, and motivation. This is because the entire variable have p-value greater than 0.05. In the table above come from either large size family or low size family or simply what ever the size of the family is more enjoyable in mathematics than boys. This is also true for confidence and usefulness in learning mathematics requested question. So they have positive attitude than male. However, there is no significant difference between them as shown in the F-test analysis in the different table before. But here it is possible to conclude that having positive attitudes towards these components of attitude not led to student's achievement in mathematics in line to these students have highly positive attitude on the usefulness of mathematics

4.4.6. Family Education.

Here the study focus on student attitude and its component ,anxiety and motivation and learning styles and its component, at the preparatory student in different schools with respect to family education levels like illiterate ,primary, Secondary, diploma and certificate and Bachelor & above in the following numerical figure 48 (15.6%), 100 (32.5%) , 73 (23.7%) ,56 (18.2%) and 31 (10.0%) respectively.

A. Achievement with respect to family education.

The table below is the descriptive statistics of the student achievement with respect to student family education and analyzed by using by F-test. The next step was to check whether there were significance differences on student achievement towards learning mathematics. The next step was to check whether there were significant differences or not in the student achievement in mathematics with respect to family education. Table 24 showed the descriptive statistics and the F-test for achievement in mathematics with respect to education. One-way ANOVA on student achievement ,attitude and it component ,anxiety ,motivation and learning style and its components with respect to family educational background (illiterate, primary educated ,secondary educated , diploma and certificate and bachelor and above) .

Table 24.Descriptive statistics and a one-way ANOVA result on student achievement with family education.

Variable	Education Status	N	M	SD	F	P
Achievement	illiterate	48	52.94	17.654	.532	.712
	Primary	100	49.62	15.951		
	Secondary	73	49.00	16.303		
	Certificate /Diploma	56	51.80	18.471		
	Bachelor & above	31	50.97	19.815		
	Total	308	50.52	17.136		

From the table shown that we can see that student's achievements mean score were 48(M=52.94),100(49.62) ,73(49.00) ,56(51.80),and 31 (50.97).respectively on education status of their family level corresponding to education.

From table 24 of the F-test of the p-value .712, this value is greater than .05 so, it can be concluded that there were no significant difference between family education and student achievement in mathematics. This finding is inconsistency to the result conducted by Haser (2006) states that the positive implication of qualification in individual achievement. The result in the study is inconsistency to the researcher about the effects of parental involvement to student mathematics achievement. He has revealed that parent's education level play an important role on their student mathematics achievement. Bracey (1998) state that there is the interrelation between family background and student achievement contribute for better achievement for test. Thus, parental education is a profound factor influencing development of student academic achievement (Eccles & Harold, 1993; Nakagawa, 2000; Pena, 2000) as cited by Jianjun Wang (2007).

B. Learning style and its component with respect to family education.

Here the study focus on student learning styles and its component, at the preparatory student in different schools with respect to family education and analyzed by using F-Test .The next step was to check whether there were significant differences on students learning style and its components with respect to family education towards mathematics.

Table 25. Descriptive Statistics and one way ANOVA result on family education and student Learning style.

Variable	Education	N	M	SD	F	P.
Learning Style	illiterate	48	3.61	.445	1.509	.199
	Primary	100	3.52	.505		
	Secondary	73	3.52	.462		
	Certificate /Diploma	56	3.49	.433		
	Bachelor and above	31	3.35	.506		
	Total	308	3.51	.475		
Auditory	illiterate	48	3.35	.628	.428	.788
	Primary	100	3.31	.538		
	Secondary	73	3.23	.617		
	Certificate /Diploma	56	3.26	.630		
	Bachelor and above	31	3.24	.764		
	Total	308	3.28	.611		
Collaborative	illiterate	48	3.91	.789	.979	.419
	Primary	100	3.83	.707		
	Secondary	73	3.81	.772		
	Certificate /Diploma	56	3.65	.837		
	Bachelor and above	31	3.68	.758		
	Total	308	3.79	.765		
Independent	illiterate	48	3.77	.622	1.390	.237
	Primary	100	3.62	.744		
	Secondary	73	3.58	.633		
	Certificate /Diploma	56	3.78	.691		
	Bachelor and above	31	3.50	.800		
	Total	308	3.65	.699		
Visual	illiterate	48	3.61	.706	2.462	.045
	Primary	100	3.48	.709		
	Secondary	73	3.50	.667		
	Certificate /Diploma	56	3.43	.732		
	Bachelor and above	31	3.11	.873		
	Total	308	3.46	.728		
Dependent	illiterate	48	3.40	.603	1.185	.317
	Primary	100	3.37	.650		
	Secondary	73	3.48	.541		
	Certificate /Diploma	56	3.33	.683		
	Bachelor and above	31	3.20	.689		
	Total	308	3.38	.630		

The table above shows that the descriptive statistics of the learning styles and its component with respect to student family education from the data the mean value of students learning style of mathematics were 3.61,3.52,3.52,3.49,and 3.35 ,the mean value of students Auditory were 3.51, 3.35, 3.23, 3.26 and 3.24 ,the mean value of

students collaborate were 3.91, 3.83, 3.81, 3.65 and 3.68 , the mean value of students Independent 3.77, 3.62, 3.58, 3.78, 3 and 50, 3 the mean value of students Visual learning style 3.61, 3.48, 3.50, 3.43 and 3.11 and the mean value of dependent learning style 3.40, 3.37, 3.48, 3.33 and 3.20 to the corresponding education level of family education; illiterate , primary educated , secondary educated , diploma and certificate and Bachelor and above respectively and from the analysis above I observed that the F-test result of students achievement, Learning style , Auditory , collaborative , Independent , Visual and dependent was 1.509, .428, .979, 1.390, 2.462, 1.185 respectively. Similarly we can observe that the significance value of student's achievement, Learning style, Auditory, collaborative, Independent, Visual and dependent were .199, .788, .419, .237, .045, and .317 respectively.

So, the F -test of each variable-value were greater than .05 except Visual learning style , it can be concluded that there were no significant differences in learning style and its component with respect to family educational level except Visual learning style .

Since the preparatory students had significant differences in Visual learning style with respect to the family education on different level and made more significant differences . To find these paired comparison Tukey HSD test were used . the Tukey HSD test for the paired educational levels for student visual learning style is given by table 25.

Table 26. Tukey HSD test for the paired educational levels of mathematics at preparatory levels with student Visual learning style.

Variable	(I) family education	(J) Family education	MD (I-J)	SE	P
Visual	illiterate	Primary	.13292	.12658	.832
		secondary	.11002	.13396	.924
		Certificate/Diploma	.18304	.14179	.697
		Bachelor & above	.50168(*)	.16610	.023
	Primary	illiterate	-.13292	.12658	.832
		secondary	-.02290	.11097	1.000
		Certificate/Diploma	.05012	.12032	.994
		Bachelor & above	.36876	.14819	.096
	secondary	illiterate	-.11002	.13396	.924
		Primary	.02290	.11097	1.000
		certificate	.07302	.12805	.979
		Bachelor & above	.39166	.15454	.086
	Certificate& Diploma	illiterate	-.18304	.14179	.697
		Primary	-.05012	.12032	.994
		secondary	-.07302	.12805	.979
		Bachelor & above	.31864	.16138	.281
	Bachelor& above	illiterate	-.50168(*)	.16610	.023
		Primary	-.36876	.14819	.096
		secondary	-.39166	.15454	.086
		Certificate/ Diploma	-.31864	.16138	.281

* The mean difference is significant at the .05 level.

From table 25 of education level variable, the student visual learning styles of family education level in illiterate no formal school entrant family made more significant difference with the Bachelor and above educated family on each variable. From the above descriptive statistical illustration in the table above differ to one other.

From Tukey test the MD (I-J) =.50168(*) of the illiterate from the (I) level family background student were significantly higher in visual learning style than in Bachelor and above educated family background. Therefore, by the Tukey HSD post hoc test shows these differences. Astin (1982) state that the educational level of the students' parents shows a pattern of relationships to various student outcomes that closely parallels the pattern found for parental income". It could not be determined from Astin's work if parental income and education.

C. Attitude, anxiety and motivation with respect to family education.

The next step is to check whether there were significant differences or not in the attitude, Enjoyment, Confidence, Usefulness, anxiety and motivation in mathematics education with respect to family education table 27.

Table 27.One-way ANOVA results on descriptive statistics of the student attitude, anxiety and motivation with respect to family education.

Variable	Education	N	M	SD	F	P
Attitude	illiterate	48	3.50	.619	.566	.688
	Primary	100	3.54	.576		
	Secondary	73	3.48	.556		
	Certificate /Diploma	56	3.63	.558		
	Bachelor/ above	31	3.55	.568		
	Total	308	3.54	.572		
Enjoyment	illiterate	48	3.77	.831	1.002	.407
	Primary	100	3.59	.712		
	Secondary	73	3.55	.625		
	Certificate /Diploma	56	3.73	.674		
	Bachelor /above	31	3.61	.989		
	Total	308	3.64	.738		
Confidence	illiterate	48	3.58	.821	1.436	.222
	Primary	100	3.59	.866		
	Secondary	73	3.55	.800		
	Certificate /Diploma	56	3.86	.773		
	Bachelor /above	31	3.71	.739		
	Total	308	3.64	.817		
Usefulness	illiterate	48	3.40	.610	.197	.940
	Primary	100	3.36	.612		
	Secondary	73	3.38	.543		
	Certificate /Diploma	56	3.43	.628		
	Bachelor /above	31	3.32	.653		
	Total	308	3.37	.572		
Anxiety	illiterate	48	3.33	.630	.493	.741
	Primary	100	3.19	.581		
	Secondary	73	3.21	.645		
	Certificate /Diploma	56	3.23	.572		
	Bachelor /above	31	3.19	.703		
	Total	308	3.21	.612		
Motivation	illiterate	48	3.83	.724	.288	.885
	Primary	100	3.74	.661		
	Secondary	73	3.70	.758		
	Certificate /Diploma	56	3.71	.756		
	Bachelor /above	31	3.71	.783		
	Total	308	3.74	.721		

From table 27 of F-test it can be concluded that there were no significant differences in the different family education level of mathematics student in attitude and its component, anxiety and motivation. Else-Quest et al. (2010) as cited by PekkaKupari& Kari Nissinen (2013) indicated that the gender gap in mathematics persists in some nations but not in others. Despite overall similarities in achievement, boys felt more confident and less anxious in their mathematics abilities and were more extrinsically and intrinsically motivated to do well in mathematics than girls, as consistent with previous research findings.

4.4.7 .Family income

Here the study focus on student attitude and its component ,anxiety and motivation and learning styles and its component with respect to family income ranging on below 1500 ETB 1500 birr (very low),greater than ETB 1500 up to less than or equal to ETB 2500 birr (low) , greater than ETB 2500 up to less than or equal to ETB 4000 birr (average) , greater than ETB 4000 up to less than or equal to ETB 5000 birr (high) and greater than ETB 5000 birr (very high),for 122(39.6%),91(29.5%) ,69 (22.4%) ,17(5.6%) and 9(2.90%) respectively. And I have used for analyzing the significance difference of student's related variable and their mathematics achievement with respect to family income using the descriptive statistics and One-Way ANOVA. The data from the background of the student response from the instrument that is treated in the given instrument in the Appendix A.

A. Achievement with respect to family income.

Table 28. Shows that a one-way ANOVA test results and descriptive statistics on student achievement difference in family income.

Variable	Income	N	M	SD	df	F	P
Achievement	Very low	122	49.75	16.875	4	.707	.588
	low	90	49.37	16.164	303		
	Average	69	51.65	18.377	307		
	High	17	54.29	21.641			
	very High	10	56.10	11.279			
	Total	308	50.52	17.136			

Table 28 shows achievement with respect to family income. The number of participants and the average score of students on their mathematics achievement was 122(M=49.75), 90(M=49.37), 69(M=51.65), 17 (M=54.29) and 10(M=56.10) this corresponding to family income in very low, low ,average, high and very high respectively. In table 28 the p-value is greater than 0.05 and it can be concluded that there were no significant differences in the achievement of mathematics with respect to family income in the five levels of student family income. In the table above one can be concluded that income did not a big deal on student academic achievement special in mathematics. More over the average mean score of the achievement result is best for student from economically better family background student. This finding is consistence to, Smith, Brooks-Gunn, and Klebanov (1997) states that the correlation between children's mathematics achievement and parental background namely parent are Socio-Economic Status and education level. Astin (1982) states that a positive relationship between a family's income and academic achievement of undergraduate students. Astin found that parental income is related to undergraduate persistence and satisfaction in African-American students from families of high income had higher college grades than those students from families of low income. Bekele A.T. & Mcc ABE.(2006) the family monthly income categorized in to in different level

C. Learning style and its component with respect to family income.

The next step was to check whether there were significant differences or not in the learning style and its components in mathematics with respect to family income. Table 29 showed the descriptive statistics and the f-test for learning style in learning mathematics and its component with respect to family income.

Table 29. Descriptive Statistics and one way -ANOVA results on learning style and its component to the student family income.

Variable	Income	N	Mean	SD	F	P
Learning Styles	Very low	122	3.53	.478	.406	.804
	low	90	3.54	.475		
	Average	69	3.45	.457		
	High	17	3.53	.543		
	very High	10	3.51	.513		
	Total	308	3.51	.475		
Auditory	Very low	122	3.3105	.55930	.713	.583
	low	90	3.2736	.62173		
	Average	69	3.1957	.67671		
	High	17	3.4412	.66309		
	very High	10	3.3250	.58095		
	Total	308	3.2817	.61080		
Collaborative	Very low	122	3.8224	.81078	.651	.627
	low	90	3.7944	.74789		
	Average	69	3.6787	.74498		
	High	17	3.8333	.68971		
	very High	10	4.0167	.61589		
	Total	308	3.7890	.76490		
Independent	Very low	122	3.6148	.65547	.288	.886
	low	90	3.6986	.70210		
	Average	69	3.6667	.74220		
	High	17	3.6912	.69614		
	very High	10	3.5250	.96069		
	Total	308	3.6522	.69887		
Visual	Very low	122	3.5178	.72468	.825	.510
	low	90	3.4648	.72991		
	Average	69	3.3986	.73832		
	High	17	3.4902	.66789		
	very High	10	3.1333	.79271		
	Total	308	3.4616	.72770		
Dependent	Very low	122	3.3770	.58602	1.066	.374
	low	90	3.4476	.60956		
	Average	69	3.3023	.64613		
	High	17	3.1849	.91021		
	very High	10	3.5286	.65656		
	Total	308	3.3752	.62997		

From the table 29 of the F-test of P-values were greater than .05 and it can be concluded that there were no significant difference in the five different level family income of mathematics students learning style and its component with respect to family income

.However, this findings in terms of student learning style and auditory, collaborative, Independent, Visual and dependent in mathematics education and family income to be aligned with the results. There is no significant difference between family income and Learning style and its component. Even though student from very high income family background is better on dependent and collaborative learning style this is because of better score in requested items .In this study there are five different types of learning style is listed and each learning style has there own respective items. Shaw Warn (2009) states that there is no significant difference between student learning style and their academic performance with or with out controlling their academic achievement. This result is coincides to the current study result here.

C) Attitude, anxiety and motivation with respect to family income.

From the SPSS result in the table below show that there is no significant difference .But statistically student come from the high monthly income family is better achiever than all the other and better scores in the mathematics achievement. Here each of the variable analyzed by comparing and independent t-test and Attitude in terms of enjoyment, usefulness and confidence. However, anxiety and motivation and student mathematics achievement with respect to family income treated by using the descriptive statistics and One-Way ANOVA.

Table 30.Descriptive statistics result and a one way ANOVA output on student attitude, anxiety and motivation.

Variable	Income	N	M	SD	F	P
Attitude	Very low	122	3.5366	.50088	.473	.756
	low	90	3.5540	.45942		
	Average	69	3.5202	.50667		
	High	17	3.4508	.56023		
	very High	10	3.7077	.51215		
	Total	308	3.5388	.49243		
Enjoyment	Very low	122	3.68	.718	.312	.870
	low	90	3.64	.647		
	Average	69	3.60	.666		
	High	17	3.52	.734		
	very High	10	3.73	.596		
	Total	308	3.64	.681		
confidence	Very low	122	3.52	.750	1.195	.313
	low	90	3.67	.663		
	Average	69	3.57	.770		
	High	17	3.38	.765		
	very High	10	3.86	1.001		
	Total	308	3.58	.741		
Usefulness	Very low	122	3.41	.482	.455	.768
	low	90	3.35	.531		
	Average	69	3.39	.458		
	High	17	3.45	.760		
	very High	10	3.53	.302		
	Total	308	3.39	.504		
Anxiety	Very low	122	3.1788	.57531	.567	.687
	low	90	3.2293	.50002		
	Average	69	3.2688	.52210		
	High	17	3.3316	.46459		
	very High	10	3.3091	.62132		
	Total	308	3.2264	.53667		
Motivation	Very low	122	3.6910	.61684	.921	.452
	low	90	3.7444	.60375		
	Average	69	3.5754	.67375		
	High	17	3.8176	.69123		
	very High	10	3.7200	.57889		
	Total	308	3.6886	.62902		

From table 30, there is no significance difference between attitude, and its component, Anxiety, motivation with respect to student family income. Since all the p value is greater than .05. From the above figure in the table income is not a major factor or variable on

student achievement .There is also greater p values than .05. Besides to this the mean score for each variable of the descriptive statistics are different. The attitude of the student come from their family monthly income in the range more than ETB 5000 (very high) is better achievers. Burris, Heubert and Levin (2004) states that the gender gap in mathematics persists in some nations but not in others. Despite overall similarities in achievement, boys felt more confident and less anxious in their mathematics abilities and were more extrinsically and intrinsically motivated to do well in mathematics than girls, as consistent with previous research findings. Ibrahim Demir (2006) states that result from his study that male student ,student have high self confidence ,student who have high economic status and high family background in income have better scores in mathematics achievement which in consistence to the current study result on student attitude in mathematics achievement.

4.6 Relationship between student Mathematics Achievement and Learning style, Attitude, Anxiety and Motivation.

Regarding the title here in the study and the descriptive statistics value shows the degree to which two or more quantitative variables are related and this may determined by correlation coefficient. When the expected correlation is exists between two variables, it means that student scores within a certain ranges from one variable associated with a score within a certain range to the other variables.

So, I want to see the relationship between achievement of students and the student related variables. So as to compute by using the Pearson correlation coefficient was applied on independent variable and dependent variable matrix.

Is there a Correlation between student's related variables and their mathematics achievement?

The table below summarizes Pearson correlation test results between achievement and attitude and its component's, anxiety, motivation and learning style and its component.

Table 31 .Pearson Correlations on the components of learning styles, attitude and anxiety and motivation on students achievement.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1.Achievement	1												
2.Learning Styles	-.014	1											
3.Auditory	.111	.542	1										
4.Collaborative	-.027	.756	.344	1									
5.Independent	-.018	.781	.367	.489	1								
6.Visual	-.007	.719	.114	.375	.494	1							
7.Dependent	-.101	.629	.118	.329	.316	.440	1						
8.Attitude	-.049	.288	.280	.247	.316	.148	-.007	1					
9.Enjoyment	-.076	.187	.192	.174	.234	.080	-.044	.840	1				
10.confidence	-.016	.170	.255	.134	.256	.077	-.140	.868	.643	1			
11.Usefulness	-.019	.342	.187	.293	.234	.215	.245	.521	.165	.206	1		
12.Anxiety	.061	-.010	.176	-.016	.036	-.047	-.176	.405	.392	.465	-.026	1	
13.Motivation	.036	.555	.527	.470	.423	.323	.168	.367	.280	.315	.237	.110	1

* Correlation is significant at the 0.05 level (2-tailed).

From table 31, for each variable in the Pearson correlation is significant at .05 levels. This can be treated as follows shown in the list below. Learning Style ($p=.781$), attitude ($p=.868$), Anxiety ($P=.465$), and Motivation ($P=.555$) and component's, like Auditory ($p=.051$), Collaborative ($p=.637$), dependent ($p=.755$), Visual ($p=.904$), Dependent ($p=.077$), Attitude ($p=.388$), Enjoyment ($p=.183$), Confidence ($p=.786$), Usefulness ($p=.736$), anxiety ($p=.288$), and motivation ($p=.531$).

Here in the table 31 it is possible to see that the statistically significantly relationship between students achievement in mathematics and students related factors (Learning style, attitude, anxiety and motivation) and learning style component and attitude component with correlation coefficient .781, .868, .465, and .555 etc... respectively.

From the given data statistically significantly relationship between students achievement in mathematics and students related variables at .05 significant level was set as an

indicator and the table above illustrate the information of the result analyzed based on student achievement and related variable with their component. For Learning style and its correlation values ($r=-.014$), auditory($r=.111$), collaborative ($r=-.027$), independent ($r=-.018$), visual ($r=-.007$), Dependent ($r=-.101$), Attitude ($r=-.049$), enjoyment ($r=-.076$), confidence ($r=-.016$), Usefulness ($r=-.019$), anxiety ($r=.061$) and motivation ($r=.036$) respectively. The Pearson correlations values for different variable with student achievement. This relationship for the above matrix shows that there was a position ship between mathematics and motivation, $r=.036$.The effect size $p=.111$, although small, is still statistically significant at the .05 level which is .045. Whereas learning style $r=-.014$, Collaborative $r=-.027$, Independent $r=-.018$, Visual $r=-.007$, Attitude $r=-.049$, confidence $r=-.016$, Usefulness $r=-.019$, these all variables are negative small effect on the achievement.

The highest correlation arise between auditory learning style and achievement ($r=.111$), indicating that the highest value than all the other variable observed that achieved high performance at the achievement test. Correlations between achievement and Visual learning style is less correlation ($r=-.007$). With the supportive idea of Chan (2007), in his research work indicates that grade 11 mathematics result had an effect on grade 12 students attitude of usefulness of mathematics and grade 11 attitude on the usefulness of mathematics also had a valuable effect on grade 12 achievement. Therefore in the study results show that usefulness of mathematics and mathematics achievement has their own effect one to the other. And anxiety, motivation and auditory variable have positive effect correlation result on achievement .That is if a student scores a good grade in his /her previous grade, this will help to increase his/her future achievement towards mathematics.

Klein (1982) describe that individual with high motivation have highly achievable option. The researcher view is support table 12 result in the current study, responded to events at more effectiveness as compared to people with low achievers motivation. Finlayson (1980) state that finding on motivation whose stress on successful students has significantly higher motivation for achievement than unsuccessful students. According to

John (1996) state that academic achievements are correlated with student's motivation. When we observe that result of this study whether there was any significant correlation of student's achievement and attitude in terms of usefulness of mathematics, confidence, Enjoyment. Here motivation and anxiety is also included variables in learning mathematics of the preparatory school student includes the zone. It has a positive correlation coefficient to each of the variables having a value of correlation coefficient indicated above. Student achievement correlates to the variables learning style, attitude, anxiety and motivation in mathematics.

So, from the table above, student's mathematics achievement was positively related to their attitude rather than motivation and anxiety. Since ($r=.045$, $p<.05$), and negatively correlation to student mathematics anxiety ($r=.061$ and $p=-.010<.05$). Therefore these two variables are influences the student mathematics achievement. And also student's achievement and their anxiety on mathematics have also correlates negatively. These shows that students anxiety has low and negatively related ($r=-.057$) and all these variable are not affect more.

In this study student scores in achievement of the attitude scale concedes to the findings on (Silashi, 1995) and Aiken, 1979). They claimed that attitude is a vital to actual student mathematics scores. Finding showed that a low ($r=-.318$), negative correlation between students mathematics anxiety and Achievement. Effandi Zakiria and Norazah Mohdand (2007) states that the effects of mathematics anxiety on matriculation Students as related to motivation and achievement. To examine the relationship between mathematics achievement and anxiety of mathematics achievement response to anxiety of mathematics were taken as less anxiety or higher anxiety.

4.7 . IMPACT OF LEARNING STYLE, ANXIETY, MOTIVATION AND ATTITUDE IN MATHEMATICS ACHIEVEMENT.

Table below shows that the ANOVA result from regression analysis and relationship between each of the components of attitude (enjoyment, confidence, usefulness) ,anxiety,

motivation and learning style (Auditory, collaborative, visual, independent and dependent) in mathematics achievement. In the following table below represent standardized regression coefficients in the ten independent variables and the Beta weight as well as the estimate variable normality from -1 and 1 which coincides to the normality range in this study for the Student Achievements Test. Under this subsection variance in mathematics achievement test can be explained by the combined effect of the independent variables.

Is there a significance impact of student's related variable and family related variable on student's mathematics achievement?

Table 32. ANOVA table that show that a collective impact of learning style, attitude, anxiety and motivation in mathematics achievement.

ANOVA	Sum of Squares	df	Mean Square	F	p
Regression	4035.105	10	403.510	1.392	.183(a)
Residual	86109.736	297	289.932		
Total	90144.841	307			

$R^2 = .045$ and

Multiple $R = .212$ for the predictor constant

In the table 32 shows that the ANOVA output from regression analysis and represents standardized regression coefficients and co linearity diagnostics for the ten independent variables and more specifically the Beta weight as well as the estimate of tolerance and the variance inflation variable. These two values for ten variables are .183 and it is shows that each factor is uncorrelated with the other independent variables. Table 32, F-Value (1.392) with $p = .183$ indicated that the multiple correlation on combined variables of the study were on student achievement .And the other also in mathematics. These jointly variables with different component and they are discussed in the following table below in the combined form.

Table 33. Collective impact of Learning style, attitude, anxiety and motivation on mathematics achievement in ANOVA table.

variable	B	SE	Beta	t	P
(Constant)	49.412	9.868		5.007	.000
Learning Styles	-.931	2.513	-.026	-.371	.711
Attitude	-3.842	2.351	-.110	-1.634	.103
Anxiety	3.076	2.014	.096	1.527	.128
Motivation	2.184	1.935	.080	1.128	.260

a .Dependent Variable: Achievement Test

The table 33 shows that there is no significant difference among the entire variable here in the table. Even if the variable have individual affects on the achievement from the previous table especially their component. Auditory learning style from learning style, dependent learning style and collaborative learning style and Visual style in mathematics .From attitude confidence and usefulness, moreover anxiety and motivation in different categories positively influences of student achievement.

The next questions examined were which variables had the greatest impact on mathematics student's achievement in mathematics students? From the component of attitude scale includes 22 –items, anxiety 10 items, motivation 10 items, five components of learning style 35-items., each related to variables on achievement scores. The variables like Enjoyment, confidence, usefulness, anxiety and motivation and auditory, collaborative, Independent, Visual and Dependent included in this study. These 10 variables are the predictors and includes achievement test were the criteria measured on the minimal scale. The appropriate statistical analysis, multiple regressions to unstandardized and standardized coefficient is summarized in the table 34 below.

.Table 34 .The t-table shows Unstandardized and standardized regression coefficient for ten independent variables and individual impact of the variables.

Variable	r	B	SE	Beta	t	p
(Constant)		51.479	10.812		4.761	.000
Enjoyment	-.076	-3.026	1.909	-.120	-1.585	.114
confidence	-.016	-.721	1.903	-.031	-.379	.705
Usefulness	-.019	.362	2.113	.011	.171	.864
Student Anxiety	.061	2.405	2.121	.075	1.134	.258
Student motivation	.036	.490	2.052	.018	.239	.811
Auditory Learning	.111	4.065	1.968	.145	2.066	.040
Collaborative	-.027	-.729	1.609	-.033	-.453	.651
Independent	-.018	-.548	1.840	-.022	-.298	.766
Visual Learning	-.007	1.523	1.685	.065	.904	.367
Dependent Learning	-.101	-3.554	1.844	-.131	-1.928	.055

When we observe the significant impact of student mathematics achievement and the variable in the model above there is significant impact on variables like auditory learning style. Therefore this model is statistically significant and its p value is .040. Since an indicated value from the table 34 is less than 0.05. In the linear regression analysis the results showed that ten factors in the next table shows the individual impact under this study accounted and the items in the questionnaires for each variable ,Independent learning style ,Collaborative learning style ,Students confidence have negative effects on achievement. From the pervious table 34, the only independent variable and auditory learning style was statistically significant.

Auditory, with Beta value .145 had a large effect in achievement where as all the other variable had no impact on student achievement. All the other correlation coefficient value like (collaborative with -.033,Independent with -.022,Visual with .065,Dependent with -.131,Enjoyment with -.120,attitude with -.031 be negatively correlate to achievement. Where as usefulness with .011, anxiety with .075, and motivation with .018 is positively Beta values. Next Beta was used in order to compare the effect or contribution of each of the components in mathematics student related variables.

In table 34, p-values indicate that the contribution of Auditory with the other variable like , collaborative, Independent, Dependent, Enjoyment, Confidence, usefulness, Anxiety and motivation in the student achievement were significant difference value and the highest t-value than all the other variable .

From the regression analysis previously table 32 above $R^2 = .045$, then the ten variables in the study relates to achievement mathematics 4.5% effect or contribution in mathematics achievement. But the calculated value from table 34 here approximately $.04487 * 100\% = 4.487\%$.The percent effect or contribution of these variables from schools Auditory (A_1), Collaborative (C_1), Independent (I), Visual (V) ,Dependent (D), Enjoyment (E) ,Confidence(C_2), Usefulness(U) ,Anxiety (A_2) ,and Motivation (M).on student achievement of student in mathematics and the percentage effect or the contribution of each component can be found by

$$R^2 * 100\% \approx (\beta_A \cdot R_A + \beta_C \cdot R_C + \beta_I \cdot R_I + \beta_V \cdot R_V + \beta_D \cdot R_D + \beta_E \cdot R_E + \beta_C \cdot R_C + \beta_U \cdot R_U + \beta_A \cdot R_A + \beta_M \cdot R_M) * 100\%$$

$$\approx (.145 * .111 + -.033 * -.027 + -.022 * -.018 + .065 * -.007 + -.131 * -.101 + -.120 * -.076 + -.031 * -.016 + .011 * -.019 + .075 * .061 + .018 * .036) * 100\%$$

$$\approx (0.0160 + 0.00089 + 0.000396 + -0.000455 + 0.0132 + 0.00912 + -0.000209 + 0.000496 + 0.004575 + 0.000648) * 100\%$$

$$\approx (0.04487) * 100\%$$

$$\approx 4.487\%$$

Where β is the standardized coefficient and r is the correlation coefficient of the respective affective variables and using the formula above. Therefore, the contribution of auditory learning style in mathematics achievement enhanced by 1.6% and similarly for collaborative 0.089%, for independent 0.0396%, for Visual -0.0455%, Dependent 1.32%, for Enjoyment 0.912% for confidence 0.0496% for usefulness -0.0209% for Anxiety 0.4575%, for motivation 0.0648%.

The calculated value is equal to $R^2 = .04487$ that is very nearly and less than the SPSS value $R^2 = .045$ in the model. The result consistence to the findings of Ibrahim Demir

(2009). A positive attitude towards school student can also be considered as an important school outcomes Haladyna, Shaughnessy and Shaughnessy, (1983) due to the facts that the items with different component and Enjoyment is negative effects, whereas usefulness have positive effects. It is also found that direct and indirect effects on mathematics achievement.

The t-values indicated that the contribution of auditory in mathematics were strongly affected their achievement in learning mathematics. At the preparatory student mathematics is one of the compulsory subjects given for all natural science stream students. It is also a major criteria to join university and (or) colleges in Ethiopia, indeed of one's future study of field. Thus, it was on the ground of that the students were supposed to give due to emphasis on the subject. More over the knowledge of mathematics is obligatory and a prerequisite for advanced study and apply the skills on different course and NSPS(natural science at preparatory school) student were in critical condition on math ability. Even though it was difficult to find out the pinpoint of the major reasons for such how achievement on the areas of content, nature of school compound ,the curriculum designers and developers view, experiences of the teachers profiles etc... .Students have better awareness on learning mathematics of the usefulness of the subject in their future endurance. The student attitude with respect to the separate school, in the following attitude scales, Attitude of student with Enjoyment of learning math, Attitude of student with confidence of learning math and Attitude of student with Usefulness of learning math are linked together component .

Multiple regression ($R_{xy1234}=.212$) and $R^2=0.045$).Which indicate there is a relation between independent variables (attitude ,Anxiety, Motivation and Learning style)and the dependent variable achievement in mathematics. Ma & Kishor, (1997) as cited by M. Nicolidau, G.Philippou, students who come to enjoy Mathematics, increase their intrinsic motivation to learn. The impact of motivation on education of mathematics of a child cannot be undermined in the view of Hall,(1989) there is a need to motivate pupils so as to arouse and sustain their interest in learning mathematics. The result of a multiple regression at linear analysis shown in the table above, indicates linear correlation

between achievement and attitude in the F-test ($F=1.392$, $p<.001$).The coefficient of adjusted $R^2=.045$ suggests that of the variance is due to the linear and combined influence of the two independent variances motivation and auditory with the dependent variable achievement. Thus, it can be said that motivation contributes the prediction of achievement test. However, Motivation is a stronger prediction and Correlations among the components of student attitude in mathematics and their rating scales in the questionnaire.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS.

The purpose of this study was to explore positive attitude, preferred learning style, minimize anxiety and maximize motivation of the preparatory school student. And to examine that hinder this variable for better achievement in mathematics them from using their preferences when learning mathematics .This chapter presents the summary of the findings ,recommendations and conclusion of the study.

5.1 Summary of the research on my study

The primarily purposes of this study was to investigate the natural science preparatory school students mathematics achievement and student related variables and family characteristics at some governmental school in special zone of Oromia region surrounding Addis Ababa to minimize the major influencing variables on students achievement.

Moreover, the specific research questions extracted for investigation were included: What are the achievement levels of learning styles in mathematics for 11th and 12th grade preparatory school natural science student? What is the level of achievement of natural science preparatory students compared with the cut off score promotion policy for both grade levels? What are the levels of natural science students of anxiety, Motivation, and attitude in mathematics? Is there any significance difference between Natural science preparatory students Mathematics achievement, learning style, anxiety, motivation and attitude with respect to family background, sex, school, grade and achievers level? Is there any significant impact of the variable family background student's Learning styles, anxiety, motivation, and attitude and students mathematics achievement? Is there any significant relationship between natural science preparatory student's mathematics achievement with learning styles, anxiety, and motivation and attitude?

This study was addressed some selected governmental school in special zone of Oromia region. The populations of the study were 308. Among those 204 male and 104 were female. Those were selected from grade 12 and grade 11 students of Burayu, Holeta, sandafaa & Sululta preparatory schools. These four schools were selected by lottery method from the special zone of Oromia regions preparatory school. The students selected from the four schools were assigned with combined knowledge, Application and comprehension items for addressing high, medium and low-achievers. The research instrument were applied by the researcher, namely one point Likert scale and five-point likert scale with achievement test were employed for data collection of the study.

At the beginning these instruments were administered on a pilot test sample section from Holeta preparatory school students from grade 11 & 12 these students were not included in the main research study. Based on this items analysis were carried and some selected 17 items were discarded out of 96. The data analysis was carried out using the reliability test score value, frequency, percentage correlations, independent t-test ANOVA and regression. The data was analyzed using the statistical software package for social science (Namely SPSS) old version 15.0 mainly the study was found in each variable and given the following out comes and discussed accordingly.

5.2 The major findings of the study

The result of this study indicates that the Natural science preparatory students are more of medium responses scores in the attitude scales and few students are higher response score or less response score in mathematics. This reveals that the student related and family characteristics of learning mathematics of grade 11 and 12 students at Medium level.

The study consistence with the study of USikin ,1982 that the preparatory school students of more over the result of the study shows that there are statistical significances b/n attitudes, learning styles, Motivation, anxiety family background and students Mathematics achievement. With the value of regression is and p value is less than p.05 which means:

- The result of regression analysis of indicated that students and family related variables and achievers level of students were statistical significant on motivation($r^2=.045, P<.05$)
- The finding shows that the students have difficult in achieving Mathematics at preparatory level on Motivating, anxiety, attitude, and learning Mathematics to overcome that challenges.
- The result shows that there is a narrow gap between in gender difference among the schools & between the grade levels. This finding shows male students' performance in mathematics achievement better than the female student's performance in both grades.
- There is significant difference between the higher and the lower achiever based on the achievement multiple choice tests at both grade levels.

The finding also shows that students failure in achievement test not on the cross boundary of knowledge, compression & Application part of the questions. They could understand somehow medium level of taxonomies terms. Most all students did not attain the highest level of Bloom's taxonomy diagram to understand question and plan state for responding multiple choice questions. Students also unsuccessful in identifying the correct answer efficiently and they have slowly weak awareness for question.

- The results of the study indicates that there is significant difference on the family related variable of learning mathematics for students and achievement on the subject with student's background.

5.3 Conclusion

The summary given above clue the majority points of the research on student related variables. High achievers are from economical high incomer family and economically very low economic family on the achievement mean scores. Almost all students have 100% positively correlate to Motivation. Majority of the participant achievement test scores below the promotion policy cut off mark.

Student attitude towards mathematics achievement on the student requested questionnaires scales positively significant it indicates 83% of the participant. Whereas Anxiety and motivation nearly insignificant to the achievement. And collaborative learning style and independent learning style is appropriate and more wanted on student response. Such variable have significant influence on student achievement when updating it.

So the educators and education officers in general and the school in particular should take the actions to avoid the student failures in mathematics and for the sake of the objective on the subject and the policy. It is obvious that sex of the respondent is strongly correlated with variables like family education or attitude of the students' however, strongly significant differences, at the levels of $p < 0.01$ observed between the indicated variables. And also family income and family education are strongly correlated to student achievement. The highest correlations are arise between the variables like students achievement and family education ($r = .996$) indicating that students with graduated education family status and achieved high score at the standard test.

5.4. Recommendations

Based on the research findings and conclusions drawn before, the following recommendations have been forwarded to mathematics education strength and concerned bodies effectively devote to build equal awareness on student education.

1. Student must give attention for the future mathematics knowledge and skills become very competent citizen rather than they ignore and neglecting them in mathematics.
2. Students try should be encouraged to use self-designed objectives, procedures and evaluations of lesson to upgrade their self-motivation.
3. Students try to upgrade the achieving level and successfulness on the subject and their score.
4. Students must attend the class regular when the learning mathematics period and participate in the mathematics subject as much as they come. They should strong

in doing homework, class work, and exercise from the text book and seek to discuss problems and question with other and ask their teachers repeatedly.

5. For school avail the facility and follow the teacher and evaluate their work. Give positive reinforcement. Form mathematics club certified student and teachers who are very competent
6. If possible, for the higher official draw and develop update curriculum, give training for mathematics teachers, and prepare mathematics forum.
7. Further consideration should be given to finding if the correlations exist between students learning styles and their standardized mathematics achievement test scores when teacher's learning styles are matched with their students.
8. Make student to view math and science as a tools rather than theoretical systems by integrating mathematics and science with other.
9. To have had a hostile environment in learning mathematics and which deprived them of the concentration and peaceful mind which they believe is on of the requirements of mathematics learning.

Appendix A
Addis Ababa University
School of Graduate Studies

College of Science Education and Behavioral studies Department of Mathematics Education

The purpose of this questionnaire is to collect data for the study which attempts to investigate the student and family related Variables (characteristics) in learning mathematics for natural science preparatory school student. The result of the study has great importance in suggesting possible solutions to the encountered problem. So, add your contribution on my study so that you are being concerned and responsible in all your responses for the fruitfulness of the study.

Part I: Selected information about you and your family current information

1. Name:_____ Father's Name _____

2. Name of your School : _____

3. Sex: Male Female

4. Language proficiency

A = Very good B. = Good C. = Satisfactory D = poor E = very poor

Language	Speaking					Writing					Listening				
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Amharic															
English															
Oromifa															

5. Your father Education level
 - a) Not attend any school
 - b) First level first cycle (1 – 8)
 - c) Secondary grades (9 – 12)
 - d) Certificate or diploma
 - e) Degree or above
6. Your Mother Education level
 - a) Not attend any school
 - b) First level first cycle (1 – 8)
 - c) Secondary grades (9 – 12)
 - d) Certificate or diploma
 - e) Degree or above
7. Your father monthly income/Revenue
 - a)Below 1500
 - b) b/n 1501 to 2500
 - c) b/n 2501 to 4000
 - d) b/n 4001 to 500
 - e) above 5001
8. Your mother's Monthly income / Revenue
 - a)Below 1500
 - b) b/n 1501 to 2500
 - c) b/n 2501 to 4000
 - d) b/n 4001 to 5000
 - e) above 5001
9. Family size including your father & mother
 - a) No brothers and sister
 - b) 1 to 2 Brother(s) and sister(s)
 - c) 3 to 5 Brother(s) and sister(s)
 - d) 6 to 8 Brother(s) and sister(s)
 - e) Above 8 Brother(s) and sister

Use the following abbreviations (x) and values, 5= “SA”= Strongly Agree, 4=A=Agree, 3=UD=undecided, 2=DA=Disagree, 1=SD=strongly disagree.

I.	Attitudes in Learning Mathematics					
A	Enjoyment of Mathematics	SA	A	un	DA	SDA
1	Mathematics makes me feel uncomfortable and nervous					
2.	I have always enjoyed studying mathematics in school					
3	I am not interested and not willing to acquire further knowledge of mathematics					
4	I enjoy going beyond the assigned work and trying to solve new problems in mathematics					
5	I am interested and willing to use concepts of mathematics outside the school and on the job					
6	Some algebra and geometry part makes me feel uneasy and confused					
7	I have never liked algebra and it is my most dreaded subject					
B	Confidence in learning Mathematics	SA	A	un	DA	SDA
8	I do not think I could do advanced mathematics					
9	I am sure of myself when I do advanced mathematics					
10	Mathematics has been my worst subject					
11	I think I could handle more difficulty mathematics					
12	Most subject I can handle ok, but I just cannot do a good job with mathematics					
13	I know I can do well in mathematics					
14	I am not good in mathematics					
15	Mathematics is hard for me					
C	Usefulness of Mathematics	SA	A	un	DA	SDA
16	Knowing mathematics will help me earn a living					
17	Doing well in mathematics is not important for my future					
18	I will need mathematics for my future work					
19	I see mathematics as something will not use very often when I get out of high school					
20	I will need a good understanding of mathematics for my future work					
21	I study mathematics b/c I known how much is useful for me					
22	I study mathematics because its knowledge uses for all other subject					

II	Motivation and Anxiety in learning Mathematics	SA	A	un	DA	SDA
	Anxiety in learning mathematics					
1	I am so nervous during a test that I cannot remember facts I have learned					
2	Mathematics doesn't scare me at all					
3	I worry a great deal about a test					
4	Of all the subjects ,mathematics is the one worry about most					
5	I would get a sinking feeling if I came across a hard problem while doing mathematics					
6	I would not bother me to learn a lot of mathematics at school					
7	I have not usually worried about being able to learn mathematics					
8	I feel at ease thinking about learning mathematics					
9	The thought of learning mathematics makes me feel restless, irritable and impatient					
10	The thought of learning mathematics makes me feel nervous					
11	When our teacher request a question in a class I have fear to respond the answer					
	Motivation in Learning Mathematics	SA	A	un	DA	SDA
1	I work hard to getting a good scores /grade					
2	I maintain attention until tasks are completed					
3	I pay attention to our teacher					
4	I think that what we are learning in this class is interesting					
5	When given a choice ,I select challenging course s and tasks					
6	I used to engage in learning activities beyond course requirements.					
7	Time passes quickly when I'm doing mathematics					
8	I enjoy the challenge of learning a new and difficult concept in mathematics					
9	I do not enjoy having to learn mathematics					
10	I motivated when the teacher request challenging questions and come with new mathematics concept to the class					
III	Learning Style in Mathematics Education					
A	Auditory Learning Style	SA	A	un	DA	SDA
1	When I am do home work, I can remember what the teacher said in the previous class					

2	My exercise/notes book hold everything the teacher forwards in mathematics class					
3	To me ,a mathematics lesson that I have listed is easier than that I have read					
4	I do well on mathematics tests if they are about things I hear in class					
5	I complete the Mathematics assignment exactly the way my teachers tell/ inform us to do them					
6	I enjoy hearing what other student think about issues raised in mathematics class					
7	If someone order me to solve mathematical problems in oral I can usually get the right answer without writing them down					
8	When I hear sequence of number ,I can remember it without writing it down					
B	Collaborative Learning style in Mathematics	SA	A	un	DA	SDA
9	I like to study for the coming math exam /test with other students					
10	I enjoyed discussing my ideas about mathematics contents with other students					
11	During pair or group activities in mathematics class ,I enjoy working with other students					
12	Students should be encouraged to share more of their ideas in mathematics with each other					
13	Class sessions make me feel like part of the team where students help each other learn mathematics					
14	I enjoy participating in small group activities during mathematics class					
	Independent Learning in Mathematics					
15	I study what is important in mathematics to me and not always what the teacher says is important					
16	I learn certain mathematical concepts on my own					
17	I feel very confident about my ability to learn mathematics on my self					
18	When I do not understand something in mathematics ,I first try to figure it out for my self					
19	I prefer to work on mathematics class projects and assignments by my self					
20	If I like mathematics topic ,I try to find out it on my own					
21	I have my own ideas about how mathematics class should be run					
22	I like to improve and develop my knowledge of mathematics on my own					

	Visual learning style in mathematics	SA	A	un	DA	SDA
23	In order to remember the solution of a math's problem better ,I should see it written down rather than listening					
24	Written math's problems are easier for me to do than oral ones					
25	I understand math problem that is written down better than one I hear					
26	When I read Mathematics instruction ,I remember than better					
27	I really do not understand ,until the teacher write it down and see it what he say					
28	When I have a written math problem to do ,I say it myself to understand it better					
E	Dependent learning style in Mathematics	SA	A	un	DA	SDA
29	I trying to decide what to study or how to do mathematics assignments makes me discomfort					
30	I want mathematics teacher to state exactly what they expect from the student					
31	I want detail and clear instructions and explanations on how to complete mathematics assignments					
32	Students should be more closely supervised by their teachers of mathematics duties/projects					
33	Students should be informed me exactly what portion is to be covered on mathematics exams					
34	I want mathematics teacher to have outlines or give notes on chalkboard					
35	I rely on my teachers techniques which shows before to complete mathematics assignments					

ኮድቁ

APPENDIX B

አዲስ አበባ የኒፒርሲቲ

ስኩል ኦፍ ግራጁኤትስትዲስ

የሥነ ትምህርት ሳይንስና የባህርይ ጥናት ኮሌጅ

የሒሳብ ሥነ ትምህርት ዲፓርትመንት

የመጠይቁ ዓላማ፡ የተፈጥሮ ሳይንስ ቅድመ የኒፒርሲቲ ወይም የመሰናዶ (ኘሪፕራቶሪ) ተማሪዎችን በማዘጋጀት ሂደት የሒሳብ ትምህርት መማር፡ ስለሚጫወተው ሚና፡ የተማሪዎቹና የቤተሰቦቻቸው አመለካከትና፡ የተማሪው የመማሪያ ስልት፡ እንዲሁም ፍራቻና ተነሰሽነት ምን እንደሚመስል ለመመራመር የሚያስችል መረጃ ለመስጠት ነው፡፡ የጥናቱ ውጤት የሒሳብ ትምህርት ችግሮችን (በህርያቶችን) በኘሪፕራቶሪ ት/ቤት ለማሻሻል የርስዎ ዓላማ ተኮር አስተያየት ከፍተኛ አስተዋፅኦ ስላለው ፎርሙን አንዲሞሉት በአክብሮት እጠይቃለሁ፡፡

ክፍል 1፡- ስለረስዎና ስለ ቤተሰብዎ የሚገልፅ መረጃ

1.

2. ያታ፡1 ወንድ ☐ 2 ሴት ☐

3. የትምህርት ቤቱ ስም-----

4. የቋንቋችሁታ

ኤ, በጣም ጥሩ ቢ, ጥሩሲ, በቂ ዲ, ደካማ ኢ, በጣም ደካማ

በቋንቋ	መናገር					መፃፍ					መስማት				
	ኤ	ቢ	ሲ	ዲ	ኢ	ኤ	ቢ	ሲ	ዲ	ኢ	ኤ	ቢ	ሲ	ዲ	ኢ
አማርኛ															
እንግሊዝኛ															
አሮሚፋ															
ሌላቋንቋ															

5. የአባትዎ የት/ደረጃ

ኤ, ት/ቤት አልገባም ቢ, 1-8 ተምሮአል ሲ, ከ9-12 ተምሮአል

ዲ, ሲርተፊኬት/ዲፕሎማ አለው ኢ, ዲግሪ/ከዚያ በላይ አለው

6. የእናትዎ የት/ደረጃ

ኤ, ት/ቤት አልገባችም ቢ, 1 - 8 ተምራለች ሲ, ከ9-12 ተምራለች

ዲ, ሲርተፊኬት/ዲፕሎማ አላት ኢ, ዲግሪ/ከዚያ በላይ አላት

7. የአባት ወርኃዊ ገቢ መጠን

ኤ, ከ1500 ብር በታች ቢ, ከ1500 - 2500 ሲ, ከ2501 - 4000

ዲ, ከ4001 - 5000 ኢ, ከ5000 በላይ

8. የእናትዎ ወርኃዊ ገቢ መጠን

ኤ, ከ1500 ብር በታች ቢ, ከ1500 - 2500 ሲ, ከ2501 - 4000

ዲ, ከ4001 - 5000 ኢ, ከ5000 በላይ

9. የቤተሰብ ሁኔታ እናትንና አባትን ጨምሮ

ኤ, ወንድሞች /እህቶች የሉኝም ቢ, 1 - 2 ወንድሞች/እህቶች አሉኝ

ሲ, ከ3 - 5 ወንድሞች /እህቶች አሉኝ ዲ, ከ6 - 8 ወንድሞች/እህቶች አሉኝ

ኢ, ከ8 በላይ ወንድሞች/እህቶች አሉኝ

ቀጥሎ ያሉትን ጥያቄዎች በማንበብ የግለሽሁን አስተያየት በሠንጠረዥ ውስጥ በለዉ ቦታ በአንዱ የ#/\$ ምልክትን ብቻ አድርጉበት፡፡ ፊደላቱንም በአጭር ተገልጻል፡ 5,በእ, በጣም እስማማለሁ፤ 4, እ, እስማማለሁ & 3, አልወ, አልወሰንኩም & 2,አልስ, አልስማማም & 1,በአል, በጣም አልስማማም

	ክፍል 1:- የሒሳብ ትምህርት ስማርያለኝ አመለካከት/ዝንባሌ/					
01	ደስተኛሆኖሂሳብንመማር	በእ	እ	አልወ	አልስ	በአል
1	የሂሳብ ትምህርት ስማር አይመቸኝም ፡፡ ብስጩ ያደርጋኛል ፡ ደስተኛም አያደርጋኝም					
2	የሂሳብ ትምህርትን ሁል ጊዜ በት/ቤት ማጥናት ደስ ይለኛል፡፡					
3	የሂሳብ ትምህርት አይስበኝም፡ ወደ ፊትም በእርሱ መቀጠል አልፈልግም፡፡ ተጨማሪ ትምህርቱን የማወቅ ፍላጎት የለኝም፡፡					
4	እንድሰራዉ ከተሰጠኝ የሂሳብ ሥራ በላይ አልፌ አደዲስ የሒሳብ የተለያዩ የሂሳብ ጥያቄዎችን በመሥራትና በመመርመር ችሎታዬን ማሳደግ ደስ ይለኛል፡፡					
5	ከት/ቤት ውጭም ሆነ በሥራ ቦታ የሂሳብ ትምህርት ዕንሰህሳቦችን የመሥራት ፍላጎት አለኝ፡፡ ለመጠቃም ፈቃደኛ ነኝ፡፡					
6	አንዳንድ የአልጀብራ እና ጂኦሜትሪ መሥራት ይከብደኛል፡፡ ግልፅም አይሆንልኝም፡፡					
7	አልጀብራ በጣም /ፍፁም/ አልወድም፡፡/የማይመቸኝም /አስጠልታ የሂሳብ ክፍል ነው፡፡					
	02 የሂሳብ ትምህርትን ማመርና የራስ መተማመን	በእ	እ	አልወ	አልስ	በአል
8	ጠንክር ያለ /ከፍተኛ የሂሳብ ትምህርት እስራለሁ ብዬ አላስብም ፡/የምሠራ አይመስለኝ/					
9	ከፍተኛ የሒሳብ ትምህርት በሚሠራበት ጊዜ በራሴ መተማመን የሰማኛል፡፡					
10	ሂሳብ የማይመቸኝ/የከፋየትምህርት አይነት ነው፡፡					
11	ጠንክር ያለ/ በጠም ካበድ የሆኑ /ሂሳብ ሲያጋጥመኝ እንደምሠራ እርግጠኛ እሆናለሁ፡፡					
12	ሌሎች ትምህርቶችን በደምብ እሰራቸዋለሁ ግን በሒሳብ ትምህርት ጥሩ አይደለሁም					
13	በሂሳብ ትምህርት ደህና መሥራት እንደሚችል እርግጠኛ ነኝ፡፡					
14	በሂሳብ ትምህርት ጥሩ አይደለሁም/ ለእኔ ከበድ ነዉ፡፡					
15	የሂሳብ ትምህርት ይከብደኛል					
	03 የሒሳብ ትምህርትን የመማር ጠቀሜታ	በእ	እ	አልወ	አልስ	በአል
16	የሂሳብ ትምህርት መረደት ለወደፊት ኑሮዬ ይጠቅማኛል፡፡ ገቢ ያስጋኛልኛል፡፡					
17	በሂሳብ ትምህርት ጥሩ መሥራት ለወደፊት ሥራዬ/ ህይወቴ ጠቃም አይደለም፡፡					
18	የሒሳብ ትምህርትን ለወደፊት ሥረዬ በጠም እፈልገዋለሁ፡፡					
19	የሂሳብ ትምህርት ከሁለተኛ ደረጃ በላይ የሚያስፈልግ አይመስለኝም፡፡ አልጠቃምም					
20	ለወደፊት ሥራዬ ጥሩ የሂሳብ ትምህርት ዕውቀት ሊያስፈልገኝ ይችላል፡፡					
21	የሂሳብ ትምህርትን የማጠናው በጣም ስለሚያስፈልገኝ ነው					
22	የሂሳብ ትምህርት/እውቀት ለሌሎቹ የትም/ ዓይነቶችም ስለሚያስፈልገኝ በደንብ እሠራለሁ፡፡					
	04 ክፍል 2.1 የሂሳብ ትምህርት በመማር ያለዉ ሥጋት (ጭንቀት)	በእ	እ	አልወ	አልስ	በአል
1	በፈተና ጊዜ ስለምጨነቅ የማውቀው ሁሉ ይጠፋብኛል፡ ብስጩም እሆነለሁ፡፡					
2	የሂሳብ ትምህርት ምንም አያስጨንቀኝም/አያሳስብኝም /አያስፋራኝም፡፡					
3	የሂሳብ ቴስትን መፈተን (መውሰድ) በጣም እፈራለሁ፡፡					

4	ከሌሎች የትምህርት ዓይነቶች የበለጠ የሂሳብ ትምህርት ያስጨንቃል፡፡					
5	ከባድ የሂሳብ ጥያቄዎችን ሥራ መንፈሴ ይጨናቃል፡ እኔ እመሰጠለሁ፡					
6	የሂሳብ ትምህርት ለመማር ራሴን አላስጨንቅም፡፡					
7	ሂሳብን ካልቻልኩ ብዬ እራሴን ብዙ አላስጨንቅም					
8	የሂሳብ ትምህርት ለመማር ብዙ ትኩረት የለኝም፡፡					
9	የሂሳብ ትምህርትን መማር ዕረፍት ይነሳኛል፤ ያስጨንቀኛል፤ ትዕግስት ያሰጠኛል					
10	የሂሳብ ትምህርት ለመማር ሳስብ እጨነቃለሁ፡፡ ሥጋት ይወረኛል፡፡					
11	የሂሳብ መምህራ ጥያቄ ሲጠይቀኝ ምላሽ ለመስጠት እፈራለሁ፡					
	05 ክፍል 2.2 የሂሳብ ትምህርት ስማር የሚያነሳሱኝ/የምያነቀቁኝ/ ነገሮች	በእ	እ	አልወ	አልስ	በአል
1	በሂሳብ ትምህርት ጥሩና የተሻለ ውጤት ለማግኘት ተግባራዊ እሠራለሁ፡፡					
2	የትምህርቱ ክፍለ ጊዜና ሥራው እስከሚያልቅ ድረስ በንቃት እከታተላለሁ፡፡					
3	መምህሩ በሚያስተምርበት ጊዜ ትኩረት ሰጥቼ እከታተላለሁ፡፡					
4	በክፍል ውስጥ የምንማረው ነገር እንደማስበው ማራኪነው ብዬ አምናለሁ፡፡					
5	የሂሳብ ጥያቄዎች የመሥራት ዕድል ባገኘው ጊዜ ከባድ ያሉትን እመርጣለሁ፡፡					
6	በክፍል ውስጥ ከሚጠበቅብኝ በላይ ለመሥራት እሞክራለሁ፡፡					
7	የሂሳብ ጥያቄዎችን ሥራ ጊዜ በፍጥነት ያልፍብኛል፡፡					
8	የሂሳብ ትም/ ስማር ፈተኝና አዳዲስ / ጠጠር ያሉ፤ ዕንሰ ሐሳቦችን ማወቅ ያሰደስተኛል፡፡					
9	የሂሳብ ትምህርት ስማር ደስተኛ አልሆንም፡፡					
10	አስተማሪዎችን አዳዲስ የሒሳብ ዕንሰ ሐሳቦችንና ተገደደሪ ፕሮቤም ሰረ ይዞ ወደ ክፍል ሲመጠ ወስጤ ነቃቃል፡፡					
ክፍል 3 ፡ የተለያዩ የሂሳብን ትምህርት የመማሪያ ሥልቶች						
06	3.1 በማደመጥ የማማር ሥልት	በእ	እ	አልወ	አልስ	በአል
1	የቤት ሥራ ሥራ መምህሩ በክፍል ውስጥ ያስተማራው /ያለውን ሁሉ አስታውሳለሁ፡፡					
2	መምህሩ ያሉት ሻርሻር ትምህርት ሁሉ በደብተራ/ በመስታዎ ላይ ይገኛል፡፡					
3	የሂሳብን ትምህርት ከማንበብ ይልቅ በማዳመጥ የበለጠ ይገባኛል፡፡					
4	በክፍል ውስጥ ያዳመጥኩትን ሁሉ በፈተና ላይ ሲመጣ በማስታወስ ጥሩ ውጤት አገኛለሁ					
5	የሂሳብ አስማንቶችን መምህሩ ባሳየኝ መልኩ እሠራለሁ					
6	ተማሪዎች በክፍል ውስጥ በሂሳብ ትምህርት ላይ የሚያነሱትን ሐሳቦችን በማዳመጥ ደስተኛ እሆናለሁ፡፡					
7	የሒሳብ ጥያቄዎችን ከፅሁፍ ይልቅ በማዳምጥበት እሠራለሁ፡፡ ያለ ወራቀት እሰረለሁ					
8	ራዘም ያሉ ቁጥሮችን በማድመጥ የበለጠ አስታውሳለሁ፡፡ ሰልዕኔቸዉ፡፡					
07	3.2 የሂሳብ ትምህርትን በጋራ የመማር ሥልት /ዘዴ/	በእ	እ	አልወ	አልስ	በአል
9	ለፈተና ወቅት ከሌሎች ጓደኞቼ ጋር አጠናለሁ					

10	ስለ ሂሳብ ትምህርት የሚነሱ ሐሳቦች ከጓደኞቹ ጋር መወያየት ደስ ይለኛል					
11	በቡድን ሥራ ወቅት ከጓደኞቹ ጋር በመሥራት በጣም ደስተኛ ነኝ፡፡					
12	ተማሪዎችን በተለያዩ የሐሳብ ት/ሐሳቦች ከጓደኞቹ ጋር መወያየት አለባቸው፡፡					
13	በክፍል ውስጥ ስማርት ሽራሴን እንደ አንድ የቡድን አባል እቆጥራለሁ፡፡					
14	በቡድን ሥራ ውስጥ መሳተፍ ያስደስተኛል፡፡					
08	3.3 በግል /ነፅ ሆኖ/ የሂሳብ ትምህርትን የመማር ዘዴ/ሥልት	በእ	እ	አልወ	አልስ	በአል
15	መምህሩ ያለውን ብቻ ሳይሆን በራሴም መንገድ በጥሩ እረዳለሁ፡ በግሌም አጠናለሁ፡፡					
16	አንዳንድ የሂሳብ ፅንሰ ሐሳቦችን በራሴ እመራለሁ/ አጠናለሁ፡፡					
17	የሂሳብ ትምህርትን በራሴ ለመማር ጥሩ የራስ መተማመን አለኝ ብዬ አምናለሁ					
18	የከበደኝ የሂሳብ ጥያቄዎች ጊዜ ወስጄ በራሴ አስብበታለሁ፡፡					
19	የሐሳብ አሳይመንቶችን / ፕሮብለሞችን በራሴ መሥራት እመርጣለሁ፡፡					
20	የሂሳብ ትምህርት ርዕሱ ከተማቸኝ/ ከወደድኩት በራሴ ለመሥራት እሞክራለሁ					
21	የሐሳብ ትምህርት እንዴት መሥራት እንዳለበት የራሴ ሐሳብ አለኝ					
22	በሐሳብ ትምህርት ያለኝ ዕውቀት በራሴ ጥረት ለማሻሻልና ለመደበር እፈልጋለሁ፡፡					
09	3.4 የሂሳብ ትምህርት በማየት የመማር ዘዴ / ሥልት	በእ	እ	አልወ	አልስ	በአል
23	የትምህርቱን ሐሰብ የበለጠ ለመረዳት ከመደመጥ ይልቅ በፅሁፍ የበለጠ ይገባኛል					
24	በፅሁፍ የሚቀርቡ የህግ ተያይዞችን የበለጠ እሠራለሁ፡፡					
25	የሂሳብ ጥያቄዎች ከማዳመጥ ይልቅ በፅሁፍ እረዳለሁ፡፡					
26	የሂሳብ መመሪያዎችን ከመደመጥ ይልቅ በማየት የበለጠ እረዳለሁ					
27	መምህሩ የምነገራውን ነገር በፅሁፍ እስከሚያስተላልፈው (እስከምፀፈው) ድረስ የበለጠ አልረዳም					
28	እንድሠራ የተሰጠኝ የሂሳብ የፅሁፍ ጥያቄ በመፃፍ እረዳለሁሀ					
10	3.5 የሂሳብ ትምህርት በጥገኝነት (በድጋፍ) የመማር ዘዴ/ ስልት፡፡	በእ	እ	አልወ	አልስ	በአል
29	የትኞቹንም የሂሳብ አሳይመንቶችን በራሴ መሥራት፤ መወሰን ይከብደኛል፡፡					
30	የሂሳብ መምህሮቹ ከተማሪውምን እንደምጠብቅበ ትክክል እንዲነግሩኝ እፈልጋለሁ፡፡					
31	የሂሳብ አሳይመንቶችን ሲሰራ ግልፅ የሆኑ መመሪያዎችን በዝርዝር እንዲናገረኝ እፈልጋለሁ					
32	ተማሪዎች በሂሳብ መምህሮቻቸው የቅርብ ክትትል ሊደረግላቸው ይገባል፡፡					
33	የሂሳብ ፈተና ሲወጣ ከየትኛው ቦታ /ክፍል /እንደሚመጣ ተማሪዎቹ በትክክል ሊነገራቸው ይገባል፡፡					
34	የሂሳብ መምህሮቹ አጫጭር ኖሮችን አዘጋጅቶ በጥቁር ሌዳ ላይ እንድፅፉልኝ እፈልጋለሁ					
35	የሂሳብ አሳይመንትን ሥሠራ የሂሳብ መምህሮቹ ባሳዩኝ ስልት ብቻ እጠቀማለሁ፡፡					

ስም ና ክፍል-----

Appended Table 1A

A. Table of specification of multiple choice items for Grade 11 text book and the items from University Entrance Examination booklet. Number was assigned for question number in the achievement test

Chapter in Grade 11	Knowledge	Compression	Application	Analysis	Total
1		10			1
2	8,15,19	5			4
3	11	12, 25	13	17	5
4	9	21	7		3
5		20, 31, 32	6,14,16,18,22,24	24	9
6	2	1	23		3
7	1		4		2
8		30			1
9		26, 28, 29	27		4
Total	7	13	10	2	32

B. Table of specification for multiple choice items from grade 12 Text book on the University Entrance Examination booklet. Number were assigned for question in the achievement test

Chapters from grade 12 math	Knowledge	Comprehension	Application	Analysis	Total
1	1	4, 13,			3
2	9	11, 18, 22,			4
3	2, 6,	5, 8,			4
4	7	1, 16,	14, 20,		5
5	10, 12, 21	17, 15,	19, 23,		7
Total	8	11	4		23

Appended Table 2A.

Total figure of Natural Science Student in four governmental preparatory schools

School	Grade	Section	Sex	Total	Grad. total
Holeta	12	C	Male	29	44
			Female	15	
		D	Male	26	44
			Female	18	
		E	Male	28	44
			Female	16	
		F	Male	32	47
			Female	15	
	11	C	Male	49	65
			Female	16	
		D	Male	39	61
			Female	22	
		E	Male	29	54
			Female	25	
		F	Male	41	60
			Female	19	
Sululta	12	A	Male	31	48
			Female	17	
	11	A	Male	34	50
			Female	16	
Burayu	11	A	Male	39	68
			Female	29	
		B	Male	45	65
			Female	20	
	12	A	Male	46	66
			Female	20	
		B	Male	40	54
			Female	14	
Sandafaa	12	A	Male	32	49
			Female	17	
	11	A	Male	33	48
			Female	15	
		B	Male	35	50
			Female	15	
Chencho	11	A	Male	35	55
			Female	20	
		B	Male	33	52
			Female	29	
	12	A	Male	30	47
			Female	17	
		B	Male	32	52
			Female	20	
GELEN	11	A	Male	32	49
			Female	17	
SEBETA	11	A	Male	30	52
			Female	22	
		B	Male	29	46
			Female	17	
		C	Male	28	50
			Female	22	
	12	A	Male	31	48
			Female	17	
		B	Male	34	53
			Female	19	
		C	Male	30	48
			Female	18	

Table Student achievement test score table 3

CODE OF STUDENT	Mean	39	44.00	79	96.00
1	26.00	40	35.00	80	96.00
2	65.00	41	91.00	81	87.00
3	87.00	42	57.00	82	35.00
4	13.00	43	44.00	83	78.00
5	39.00	44	74.00	84	48.00
6	74.00	45	39.00	85	70.00
7	70.00	46	78.00	86	35.00
8	22.00	47	35.00	87	52.00
9	44.00	48	70.00	88	91.00
10	26.00	49	52.00	89	48.00
11	48.00	50	78.00	90	44.00
12	74.00	51	72.00	91	34.00
13	74.00	52	50.00	92	49.00
14	48.00	53	52.00	93	49.00
15	74.00	54	97.00	94	28.00
16	65.00	55	70.00	95	43.00
17	70.00	56	61.00	96	61.00
18	26.00	57	39.00	97	43.00
19	44.00	58	83.00	98	65.00
20	87.00	59	61.00	99	52.00
21	44.00	60	35.00	100	52.00
22	70.00	61	44.00	101	43.00
23	70.00	62	61.00	102	35.00
24	17.00	63	57.00	103	39.00
25	74.00	64	83.00	104	61.00
26	39.00	65	91.00	105	26.00
27	52.00	66	39.00	106	39.00
28	74.00	67	65.00	107	57.00
29	96.00	68	52.00	108	48.00
30	30.00	69	57.00	109	43.00
31	70.00	70	26.00	110	43.00
32	70.00	71	52.00	111	65.00
33	39.00	72	74.00	112	48.00
34	30.00	73	65.00	113	52.00
35	74.00	74	78.00	114	48.00
36	78.00	75	22.00	115	43.00
37	61.00	76	87.00	116	57.00
38	26.00	77	61.00	117	43.00
		78	83.00	118	91.00

119	52.00	160	40.00	203	60.00
120	57.00	161	32.00	204	33.00
121	72.00	162	81.00	205	38.00
122	53.00	163	32.00	206	34.00
123	43.00	164	50.00	207	34.00
124	25.00	165	31.00	208	48.00
125	49.00	166	25.00	209	48.00
126	52.00	167	62.00	210	70.00
127	47.00	168	50.00	211	60.00
128	38.00	169	34.00	212	40.00
129	31.00	170	34.00	213	52.00
130	34.00	171	27.00	214	40.00
131	34.00	172	50.00	215	40.00
132	60.00	173	78.00	216	36.00
133	38.00	174	75.00	217	36.00
134	50.00	175	50.00	218	20.00
135	50.00	176	33.00	219	70.00
136	34.00	177	28.00	220	56.00
137	47.00	178	41.00	221	28.00
138	53.00	179	54.00	222	52.00
139	70.00	180	57.00	223	33.00
140	44.00	183	56.00	224	40.00
141	60.00	184	60.00	225	50.00
142	56.00	185	53.00	226	40.00
143	47.00	186	53.00	227	37.00
144	63.00	187	48.00	228	70.00
145	70.00	188	44.00	229	40.00
146	38.00	189	38.00	230	50.00
147	56.00	190	37.00	231	78.00
148	47.00	191	35.00	232	50.00
149	28.00	192	35.00	233	78.00
150	31.00	193	44.00	235	50.00
151	28.00	194	22.00	236	82.00
152	60.00	195	25.00	237	70.00
153	47.00	196	41.00	238	60.00
154	29.00	197	38.00	239	48.00
155	49.00	198	33.00	240	60.00
156	53.00	199	60.00	241	49.00
157	35.00	200	40.00	242	50.00
158	37.00	201	30.00	243	70.00
159	34.00	202	50.00	244	30.00

245	50.00	287	41.00
246	50.00	288	50.00
247	40.00	289	40.00
248	40.00	290	41.00
249	32.00	291	39.00
250	32.00	292	38.00
251	44.00	293	40.00
252	32.00	294	38.00
253	48.00	295	32.00
254	36.00	296	22.00
255	40.00	297	40.00
256	78.00	298	3.00
257	50.00	299	41.00
258	40.00	300	40.00
259	32.00	301	50.00
260	44.00	302	56.00
261	48.00	303	60.00
262	52.00	304	68.00
263	56.00	305	60.00
264	58.00	306	60.00
265	62.00	307	64.00
266	84.00	308	50.00
267	70.00	309	55.00
268	50.00	310	45.00
269	38.00	311	55.00
270	44.00	312	30.00
271	48.00	Total	50.52
272	66.00		
273	36.00		
274	70.00		
275	50.00		
276	50.00		
277	72.00		
278	42.00		
279	44.00		
280	76.00		
282	44.00		
283	53.00		
284	49.00		
285	43.00		
286	32.00		

Appendix D

School Based Mathematics Examination for grade 11

Name: _____ Roll No _____ school _____

Part I. CHOOSE THE BEST ANSWER FROM THE GIVEN ALTERNATIVE AND ENCIRCLE IT.

1. Suppose that A and B are 3 x 3 matrices, I is the identity matrix of order 3 such that $AB = 2I$, If $\det(B) = |B| = 6$. What is $\det(A^T)$?

A. $1/3$ B. $4/3$ C. 12 D. 48

2. Suppose $A = \begin{pmatrix} 1 & 2 \\ 2 & 3 \end{pmatrix}$ If X is a 2 x 2 matrix such that $AX - A^T = 2A$, then what is the value of X?

A. $\begin{pmatrix} 3 & 1 \\ 1 & 3 \end{pmatrix}$ B. $\begin{pmatrix} 3 & 3 \\ 3 & 3 \end{pmatrix}$ C. $\begin{pmatrix} 3 & 6 \\ 6 & 9 \end{pmatrix}$ D. $\begin{pmatrix} 3 & 0 \\ 0 & 3 \end{pmatrix}$

3. which one of the following is the simplest form of $|3 + 4i| \cdot \frac{25i}{3+4i}$?

A. $5 - 5i$ B. $5 + 5i$ C. $1 + 3i$ D. $1 - 3i$

4. If $z = \cos\left(\frac{\pi}{10}\right) + i\sin\left(\frac{\pi}{10}\right)$ then what is the value of z^5 ?

A. $\left(\frac{\pi}{2}\right) + \left(\frac{\pi}{2}\right)i$

C. i

B. $\frac{1}{2} + \frac{1}{2}i$

D. $1 + i$

5. What is the value of $|x| + 2x$ if $x < 0$?

A. $-3x$ B. $3x$ C. -3 D. x

6. Among students who took a quiz, 15 students scored 6, 20 students scored 7, 10 students scored 8 and 5 students scored 10. What is the average score of the students?

A. 7.2 B. 7.5 C. 7.8 D. 7.0

7. For real numbers x and y, which one of the following statements is true?

A. $(\forall x)(\exists y)((x^2 + y + 1 = 0))$

B. $(\exists x)(\forall y)((x^2 + y + 1 = 0))$

C. $(\forall y)(\exists x)((x^2 + y + 1 = 0)$

D. $(\exists x)(\forall y)(x^2 + y + 1 =$

8. Which one of the following functions has NO vertical asymptotes?

A. $f(x) = \ln(x+1)$

D. $f(x) = \frac{x-1}{x^2-x}$

B. $f(x) = \frac{x^2+1}{x^3+8}$

C. $f(x) = \frac{x^2-9}{x-3}$

9. Let p, q and r be propositions such that p is false. Then, which one of the following propositions is true?

A. $p \Rightarrow r$

C. $\neg p \Leftrightarrow q$

B. $r \Rightarrow q$

D. $q \Leftrightarrow r$

10. If $f(x) = \frac{1}{1+e^x}$, then which of the following is equal to $f^{-1}(x)$?

A. $\ln(1-x) - \ln(x)$

C. $\ln\left(\frac{1}{x+1}\right)$

B. $1 + e^{-x}$

D. $\frac{1}{1+e^{-x}}$

11. If $x^2 - 6x + z^2 + k = 0$ is equation of a circle with radius 2, then what is the value of k?

A. 13

B. 5

C. 4

D. -4

12. If a line with angle of inclination $\frac{3\pi}{4}$ of passes through (0, 1) which one of the following is the equation of the line?

A. $Y = -x + 1$

C. $Y = -x - 1$

B. $Y = x + 1$

D. $Y = x - 1$

13. A parabola with focus at (3, - 1) has directrix $y = 3$. Which one of the following is the equation of the parabola?

A. $(x-3)^2 = -4(y+1)$

C. $(x-3)^2 = 4(y+1)$

B. $(x-3)^2 = -8(y+1)$

D. $(x-3)^2 = 8(y+1)$

14. In the set of complex numbers, which one of the following is the solution set of $z^3 - iz^2 + 2 = 0$.

- A. $\{0\}$ B. $\{0, -i\}$ C. $\{0, -1, 2i\}$ D. $\{0, 1, -2i\}$

15. What is the solution set of $\frac{2}{x} - \frac{x-2}{x^2-2x} = \frac{2x-2}{3x-2}$?

- A. $\{1, -2\}$ B. $\{1, 2\}$ C. $\{-1\}$ D. $\{1\}$

16. How many four digit even numbers can be formed from 1, 2, 3, 4 and 5 if the numbers start with 3?

- A. 40 B. 50 C. 100 D. 120

17. A satellite moves along a hyperbolic curve whose horizontal transverse axis is 24 km and an asymptote $y = \frac{5}{12}x + 2$, then, what is the eccentricity of the hyperbola?

- A. $\frac{5}{13}$ B. $\frac{12}{13}$ C. $\frac{13}{12}$ D. 12

18. The mark that students scored in an examination is grouped in class intervals as shown in the following in the following table

Class interval (Mark)	Number of the students
55-64	8
65-74	12
75-84	20
85-94	6
95-100	4

What is the median of the mark?

- A. 25 B. 75.5 C. 77 D. 79.5

19. Give $f(x) = \ln(x-1)$ and $g(x) = \sqrt{1-2x}$, which one of the following is the domain of ?

- A. $\{x \in \mathbb{R} : x > 1\}$ C. $\{x \in \mathbb{R} : x > \frac{1}{2}\}$
 B. $\{x \in \mathbb{R} : x < 0\}$ D. $\{x \in \mathbb{R} : x \leq \frac{1}{2}\}$

20. A committee consisting of 3 students is to be selected from 10 candidates among which 4 are girls. What is the probability that at least one girl is selected?

A. $\frac{5}{6}$

B. $\frac{2}{3}$

C. $\frac{1}{3}$

D. $\frac{1}{6}$

21. consider the following argument:

“If he does not love her, she will not marry him

He loves her. Therefore, she will marry him”

If $P \equiv$ He loves her’ and $q \equiv$ she will marry him’. Which one of the following is the correct representation of the argument and its validity?

A. $P \Rightarrow \neg q, p \vdash q$,Valid argument

D. $P \Rightarrow q, p \vdash q$,Invalid argument

B. $P \Rightarrow \neg q, p \vdash q$,invalid argument

C. $P \Rightarrow q, p \vdash q$,Valid argument

22. A group of six students take their seats at random in a round table for a discussion. What is the probability that two specific students do NOT sit together?

A. $\frac{3}{5}$

B. $\frac{2}{5}$

C. $\frac{2}{3}$

D. $\frac{1}{3}$

23. Consider the system
$$\begin{cases} ax + y + z = 1 \\ x + 2y + 4z = 0 \\ 5x - y + z = 0 \end{cases}$$

If the determinant of the coefficient matrix is 2; then what is the solution of the system of equations?

A. $\left(3a, \frac{19}{2}a, -\frac{11}{2}a\right)$

D. $\left(\frac{3}{2}, \frac{19}{2}, -\frac{9}{2}\right)$

B. $\left(3, \frac{19}{2}, -\frac{11}{2}\right)$

C. $\left(\frac{3}{a}, -\frac{19}{2}, \frac{11}{2}\right)$

24. A box contains 5 white, 6 red and 4 black balls of identical size. If 3 balls are randomly taken out of the box one after the other, what is the probability that the first ball is white and both the second and third balls are red?

- A. $\frac{2}{15}$ B. $\frac{3}{15}$ C. $\frac{4}{75}$ D. $\frac{5}{91}$

25. For what value of b does the parabola $p(x) = a + x + bx^2$ pass through the points (-1, 5) and (2, -1)?

- A. 9 B. 3 C. -3 D. -15

26. What is the value of $\arctan(\tan \frac{2}{3}\pi)$?

- A. $\frac{\pi}{3}$ B. $-\frac{\pi}{3}$ C. $\frac{\pi}{6}$ D. $-\frac{\pi}{6}$

27. Which of the following is true about the function $f(x) = 2\sin \frac{x}{3}$?

- A. The period of f(x) is $\frac{2}{3}\pi$ D. The range of f(x) is increasing on $[0, 2\pi]$
 B. $f(x) < 0$ for $x < 3\pi$
 C. If $x \in [3\pi, 6\pi]$, then $f(x) \in [0, 1]$

28. What is the simplified form of $\sin(x - \frac{\pi}{2}) \tan x$?

- A. $-\sin x$ B. $-\cos x$ C. $\sin x$ D. $\cos x$

29. On the interval $[0, 2\pi]$, what is the solution set of $\sin 2x = \cos x$?

- A. $\{\frac{\pi}{2}, \frac{3\pi}{2}\}$ C. $\{\frac{\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}\}$ D. $\{\frac{\pi}{6}, \frac{5\pi}{6}, \frac{\pi}{2}, \frac{3}{2}\pi\}$
 B. $\{\frac{\pi}{6}, \frac{5\pi}{6}\}$

30. Suppose that the magnitude of the vector U is 15 and its direction is 120 (from the positive x axis). what are the components of U, respectively.

- A. $-\frac{15}{2}, 15\frac{\sqrt{3}}{2}$ B. $-\frac{15}{3}, 15\sqrt{2}$ C. $\frac{15}{2}, 10\sqrt{3}$
 D. $12\sqrt{3}, -\frac{15}{2}$

31. The following is data on a mid – semester examination results of 40 students.

Mark	16-20	21-25	26-30	31-35	36-40
No. students	2	6	10	12	10

Which one of the following is the mean deviation about the modal mark of the students?

- A. 4.6 B. 4.75 C. 4.8 D. 4.82

32. A group of 100 items have a mean of 62. If the mean of 40 of these items is 55, what is the mean of the remaining items?

- A. 69
B. 65
C. 66.67
D. 64.

Appendix E

School Based Mathematics Examination for grade

12 Name: _____ Roll No. ----

school _____ Part I.

CHOOSE THE BEST ANSWER FROM THE

GIVEN ALTERNATIVE AND ENCIRCLE IT

1. On which one of the following intervals does increase $f(x) = x^4 + 4x$ increase

A. $(-\infty, -1]$

C. $[-1, \infty)$

B. $(-\infty, 0]$

D. $(-\infty, \infty)$

2. If, $f(x) = e^{2x} + x - 3 \cos(x)$, then what is $f''(x)$?

A. $e^{2x} + 1 - 3 \sin(x)$

C. $4e^{2x} - 3 \cos(x)$

B. $e^2 + 1 + 3 \sin(x)$

D. $4e^{2x} + 3 \cos(x)$

3. What is the 50th term of the sequence 3, 10, 17, 24, 31. . .

A. 310

B. 346

C. 510

D. 531

4. If $\{a_n\}$ is a sequence such that $a_1 = 2$ and $a_{n+1} = a_n + 4$ for all $n \geq 1$, $\sum_{n=1}^{35} a_n$ then is equal to :

A. 2460

B. 2456

C. 2450

D.

5. If $f(x) = x^2 + 2 \ln x$, then what is $\lim_{h \rightarrow 0} \frac{f(2+h) - f(2)}{h}$?

A. 5

B. 4

C. 2

D.

6. What is the value of $\lim_{x \rightarrow \infty} \left(1 + \frac{1}{x}\right)^{\frac{-x}{2}}$?

A. $\frac{1}{\sqrt{e}}$

B. $\sqrt{e}$

C. e^{-2}

D. ∞

7. If $f(x) = x f'(x) - \sqrt{f(x)}$ and $f'(x) = 4$ then which of the following is equal to $g'(2)$?

A. 11

B. 8

C. 2

D. 0

8. Which one of the following is true about the derivative of $f(x) = x|x|$?

A. F is differentiable at $x=0$

B. $F'(x) = 2|x|$, for every $x \in (-\infty, \infty)$

C. $F'(x) = 2x$ for every $x \in (-\infty, \infty)$

D. $F'(x) = |x| + x$, for every $x \in (-\infty, \infty)$

9. If $f(x) = \frac{1}{1+e^x}$, then which of the following is equal to $f^{-1}(x)$?

- A. $\ln(1-x)$ C. $\ln\left(\frac{1}{x+1}\right)$
 B. $\ln(x)$ D. $\frac{1}{1+e^{-x}}$
 C. $1+e^{-x}$

10. Which one of the following is equal to $\int (1+x)3^x dx$?

- A. $(1+x)3^x - 3^x + C$
 B. $(1+x)3^x + (\log_3 e)3^x + C$
 C. $(1+x)3^x(\log_3 e) - 3^x(\log_3 e) + C$
 D. $(1+x)3^x(\log_3 e) - 3^x(\log_3 e)^2 + C$

11. Let $f(x) = \begin{cases} 3^x + k, & \text{if } x \leq 0 \\ 3^{\frac{\sin(2x)}{x}}, & \text{if } x > 0 \end{cases}$

If f is continuous at $x=0$, then what is the value of k ?

- A. 6 B. 5 C. 2 D. 0

12. What is the value of $\int_0^{\frac{\pi}{2}} 2x \cos x dx$?

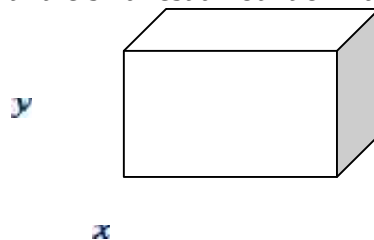
- A. -2 B. $\frac{\pi}{2} + 1$ C. $\frac{\pi}{2} + 2$ D. $\frac{\pi}{2} - 1$

13. What is the sum of the series $\sum_{n=1}^{\infty} \frac{2^{2n+1}}{5^n - 1}$?

- A. 40 B. 20 C. 10 D. 8

14. A box seen below is to have a square base, an open top and volume of 32 cubic units. If x is the length of each side of its base and y is its height, how many units should x and y be in order to make the open top box with the smallest amount of material?

- A. $X=4, y=2$
 B. $X=2, y=8$
 C. $X=\sqrt{8}, y=4$
 D. $X=\sqrt{2}, y=16$



15. Which one of the following is equal to $\int \frac{1}{x+x^2} dx$?

A. $\ln(x^2 + x) + c$

C. $\ln x - \ln(x+1) + c$

B. $2\ln(x+1) + \ln x + c$

D. $\ln x + \ln(x+1) + c$

16. Which one of the following is the equation of the line tangent to the graph of $f(x) = \frac{1}{x+1} + \cos x$ at $(0, f(0))$?

A. $x + y = 1$

C. $x + y = 2$

B. $x - y = -2$

D. $x + 4y = 2$

17. Which one of the following is equal to $\int \frac{\ln(xe^x)}{x} dx$

A. $\ln(x) + \frac{1}{2}e^x + c$

C. $\ln(x) + e^{2x} + c$

B. $\frac{1}{2}(\ln x)^2 + x + c$

D. $\frac{-1}{x^2} + (\ln x)^2 +$

18. Which one of the following is equal to $\lim_{n \rightarrow \infty} \frac{1 - n - 3n^2}{6n^2 + 1}$?

A. 1/6

B. -1/2

C. -1/6

D. $-\infty$

19. The volume V of a melting ice cube after t seconds is $V = 2000 - 40t + 0.2t^2$ (in cm^3).

How fast is the volume changing when $t = 40$ seconds

A. $24 \text{ cm}^3/\text{sec}$

C. $15 \text{ cm}^3/\text{sec}$

B. $-15 \text{ cm}^3/\text{sec}$

D. $-24 \text{ cm}^3/\text{sec}$

20. At which value(s) of x does $f(x) = \frac{1}{4}x^4 - 2x^2$ have a local maximum?

A. $x=0$

C. $x=-2$ and $x=2$

B. $x=4$

D. $x=0$ and $a=2$

21. What is an anti-derivative of $f(x) = \frac{2}{4x^2 + 4x + 1}$?

A. $\frac{1}{2x+1}$

C. $\frac{-1}{2x+1}$

B. $\frac{-2}{2x+1}$

D. $\ln(4x^2 + 4x + 1)$

22. Which one of the following is equal to $\lim_{x \rightarrow 1} \frac{1-x}{1-x^2}$?

A. 1

B. 0

C. -1/2

D. Does not exist

23. What is the area of the region between the graphs of $y = x^2$ and $y = -x + 2$, where $0 \leq x \leq 2$?

A. 3

B. $\frac{2}{3}$

C. 3/2

D. 1/3

REFERENCES

- Adamu Genaro (2004): Gender Differences in Mathematics Achievement at the Secondary Cycle and primary schools of South west Showa Zone.
- Addis Alemayehu (2013): The Impact of Civic and Ethical Education on the Students Behavior.
- Ailey, J. and A. Fordham (1991): the development and application of National indicators of educational effectiveness. In: J. Hewton (Ed.), *Performance Indicators in Education*. Brisbane: Department of Education, Queensland.
- Anastasia Efkalides (2010): Trends and Prospects in Meta Cognition Research and Mathematics Pretest achievement.
- Anastasia (2011): Mathematics Achievement: The Role of homework and self efficacy Beliefs.
- American Association of University Women (1992): *Shortchanging Girls, Short changing America: A Call to Action*. ERIC Document Reproduction Service No. ED 340658.
- Arnot, M., M. David and G. Weiner (1989): *Educational reforms and gender* Marileane Panthiara and George philippou Department of Education, University of Cyprus).this paper presents some results on students motivation & their achievement in mathematics.
- Aiken, Mc (Ed) 1992: Encyclopedia of Educational Research vol. 3 New York the American Education Research Association.
- Agarwal R (1985) Effectiveness of reception concept attainment model of teaching for enhancing attainment of science concept. M Ed Dissertation, Department of Education, Allahabad University.
- Aggarwal Yash (1998) Quality concerns in the primary education, Where is the problem. NIEPA, New Delhi.
- Akdemir (2012): Attitude towards Mathematics Review of Educational Research.
- Assebe Getahun (1997). The attitudes of secondary schools students toward school and subject matters. Unpublished M.A Thesis, Addis Ababa University.
- Ascharfit Mark H;(19989):On the Cognitive Development Consequences of Mathematics anxiety and Development of Mathematical Skill:
- Bekele A.T. & Mcc ABE.(2006).Awareness and Determinants of family planning practices in Jimma, Ethiopia.
- Betiz,N.(1978).Prevalence ,Distribution ,and Correlates of Mathematics in College Students .Journal Of Counseling Psychology.
- Boyer, C.B.&Merzbach, U.C (1989):A History of Mathematics New York John Wiley and Sons.

- Brown,S.M(1993):Motivational effect on test scores of elementary students Journal of Educational Research, (86)
- Butty, L.M (2002): Student attitudes, and Mathematics performance among 10th and 12th grade black and Hispanic students.
- Campbell (2000): Identifying Factors Affecting the Mathematics Achievement.
- Cheung, k.c (1988): Schooling Mathematics achievement and attitudes towards mathematics learning in Hong Kong Educational Studies in Mathematics (19(2).
- David (1984): High Technology in Mathematics. Mathematics as a tool in activities arising from the developing needs of technology and Science.
- Davidson (1990): Addressing Learning Styles Difference among Students.
- Desalegn chalchisa (2005) :comparative study of student's achievement in English and mathematics in Addis Ababa University, Amharia and Oromia regional states,Ethiopia Unpublished Ph.D Thesis,
- Doepken, D. Lawsdy, E, & padwa, L. (2006): Modified Fennema Sherman attitude scales Retrieved March 21, 2007 from <http://www.Woodrow.Org>.
- Doolen Lawrence: A solution of Algebraic Word Problems following training in identifying necessary and sufficient information with problems.
- Doolen, L.S & Hongisfeld .A. (2000): Illuminating the standard with learning styles.
- Dunn,R & Dunn,K.(1993):Teaching Secondary Students Through Individual Learning Style. Practical Approaches for grade 7-12.
- Elizabeth Fennema and Julia A. (1970's): In an Effect to Study Students Attitude towards mathematics.
- Effandi Zakaria & Norazah Mohd,(2007).The Effects of Mathematics anxiety on matriculation Students as related to Motivation and Achievement.
- Fennema, E; and Tartes, L.A. (1995): Mathematics achievement and gender Educational studies in Mathematics, 28(3). From online [http:// www Jstor. Org](http://www.Jstor.Org) Iben, M.F (1991). Attitudes and Mathematics comparative education, 27 (2).
- Fennema and Tarte (1995): Spatial Skills and Mathematical Problems Solving ability.
- Fennma E.,& Sherman,J.,(1976).Fennma-Sherman Mathematics attitudes scales: Instruments Designed to measure attitude towards the learning mathematics by Females and males.(Journal For Research in Mathematics Education)
- Fennema, E., & Sherman, J. (1978). Sex related differences in mathematics achievement and related factors: A further study. *Journal for Research in Mathematics Education*, 9

- Gizachew Ashagreie, Yekoye, Dbebe (2004): Free Health Care Provision and its Financial Implications in Gonder town North Ethiopia.
- Grasha-Reichmann (2006): Learning Style Constructing college course to facilitate, Assess, and Document in learning style.
- Haladyna, T., Shaughnessy, J. & Shaughnessy, J. M. (1983). A causal analysis of attitude toward mathematics. *Journal of Research in Mathematics Education*, 14, 19-29.
- Hambree, R. (1990): The nature, effect and relief of mathematics anxiety: Journal for Research in Mathematics Education.
- Hilton, 1981 and Otten & Kuyper, 1988: Motivation for Achievement in Mathematics.
- Ibrahim Demir (2006). The Effect of quality of educational resources on mathematics achievement.
- Ibrahim Demir (2009). Factors Affecting Turkish Students Achievement in Mathematics and Science.
- Jone's (1981): Policy perspectives on educational Testing, Trends in levels of academic achievement.
- June's (2008): The concept of preferences to different individual learning style was introduced in mathematics and Science.
- Junko (1998): Learning Style and error correction. How do learning styles affect students? Perceptions towards error connection in a foreign language class room.
- John M. Carnwell (1994): The Use of nominal Analysis and four primary learning Style.
- Kouassi, S.F. (1999). A psychological Study of mathematics attitude and achievement among female students. Retrieved April 15 from <http://www.widmsu.edu>.
- Lahey (1995): Development of Achievement Motivation: Student/Teacher relations between attitude towards mathematics before and after the expectations.
- Linn, M. & Hyde, J. (1989). Gender, mathematics, and science. *Educational Researcher* 18, 17-19, 22-27.
- Marilyn: Family Effects On Students Achievement in Thailand and Maliwi.
- Ma, X. (1999). A meta analysis of the relationship between anxiety towards mathematics and achievement in mathematics. Journal for research in mathematics education.
- Middleton, A.J., & Spanish, A.P. (1999). Motivation for Achievement in Mathematics: Findings, Generalizations and Criticisms of the research. Journal for Research in Mathematics Education.

- McLeod, D.B. (1994). Research on Affect and Mathematics Learning in the JRME: 1970 to Journal for Research in Mathematics Education 25 (6),.
- McLeod, D. (1992): Research on affect in mathematics education : A re-conceptualization ... of research on mathematics teaching and learning. Retrieved from <http://www.peterlijedahl.com/wp-content/uploads/Affect-McLeod.pdf>
- MacCoby and Jacklin (2004): Influence of the gender factor on a student's learning style and achievement.
- Mekasha Kassaye (2005): The Ethiopian Journal of Higher Education.
- Mekasha Belete (2000): Some Factors Affecting Female Pupils' Participation and Academic Performance in Primary Education in Amhara Region. Unpublished Thesis A.A University.
- Mary Lynne (2011): Students Learning Style Preference and Teacher's instructional strategies.
- Mulugeta Atnafu (2010): The Relationship tenth grade students' Attitude and Components of attitude in mathematics with mathematics education at A.A secondary schools, Staff and educational development.
- Murat Peker (2009): Pre-Service Teachers Anxiety about Mathematics and their Learning style.
- National Council of Teachers of Mathematics (1989). Curriculum and Evaluation standards for school Mathematics. Reston, VA: Author
- Om P. Ahuja (2005): World Class High Quality Mathematics Education for all K-12 American Students.
- O'Reilly, R.R (1980) Attitudes of secondary students concerning the nature of Mathematics, mathematics teaching and Mathematics learning related to achievement, Canadian Journal of Education, 5(3), P.76 – 87 from <http://www.Jstor.org>
- Ornstein (1994): Methods and Skills that apply to work world, different people learn differently.
- Orton and Wain, G. (1994) Issues in Teaching Mathematics London Red World Books.
- Pajares & Schunk, (2002). The National Council of Supervisors of Mathematics student achievement series in mathematics.
- Pamela E. Davis-Kean (2000): The Influence Of Parent Education and Family Income on Child Development .
- Pekka. Kupari (2013): Background factors Behind Mathematics Achievement in Finnish.
- Phan (2007): The Effect of the main independent Variable Deep approaches.

- Phan(2007): Student have their own Style to receive and respond to learning of Mathematics Science.
- Ramsden (1988): A hand book for teaching and learning in higher education enhancing Academic practice learning in mathematics.
- Rech J.F. (1994) A comparison of Mathematics attitudes of Black students according to grade, Academic achievement & gender, Journal of Negro Education,
- Richardson,F.C., & Suinn R.M. (1972).The Mathematics Anxiety Rating Scale: Psychometric Data Journal of Counseling Psychology.
- Robert,S.O.,& Vukovic ,R.K.(2013) .Parental Involvement and Expectation :Implications for different types of mathematics achievement.
- Roskopf, M.F. (1990) Mathematics Education Historical perspectives, Washington: National Council of Teachers of Mathematics (NCTM).
- Ryan (1985):Self Determination of Motivation in intrinsic motivation in Human Behavior.
- Salvin (1990): The Impact of Learning Style Student Grouping for collaborative Learning.
- Schofield H.L. (1972) Grade level, sex and the relationship between Mathematics attitudes and Achievement.
- Surferl Tilahun (2004) Assessment of the relationship between general secondary educational EGSECE and Grade 11 preparatory students' performance in East Wollegn Zone Secondary schools unpublished M.A. Thesis, Addis Ababa University. N
- Shaw Warn (2009. Students Learning Style and their Academic Achievement for Taxation.
- Swatson et.al. (1982) Rural Elementary Students' Attitudes toward Mathematics, *Rural Educator*
- Tapia,M. & Marsh,II ,G.E.(2004). An instrument to measure mathematics attitudes academic exchange quarterly.
- Tapia, M. (2004). The relationship of math anxiety and gender. *Academic Exchange Quarterly*, 8 (2).
- Rita Stafford Dunn, (2000): A practical Approach of Using Learning Style in Higher education
- University of the North British Columbia (2008). The importance of Mathematics for a future career from [http://www unbac.ca/meth/math importance htm](http://www.unbac.ca/meth/math%20importance.htm).
- University of southern Mississippi the Aquila Digital community. (2013). The relationship between Attitudes and Achievement in Mathematics among lower grade students. Madeleine P.Michell:

- Wang et.al. (2008). The Learning Style Academic Achievement among student. Case study on improving high school students.
- Woods (2010): Benefits of Collaborative Learning Style.
- World Bank (1993): Primary School Achievement in English and Mathematics in Zimbabwe.
- Xin. Ma (2014): A comparative analysis Of the Relationship between Learning style and mathematics Performance.
- Zakaria and Effandi (2008): Anxiety and Motivation were measured using the Fennema-Sherman Mathematics Anxiety Scale.
- Zhang,Li-Fang,(2001);Do styles of thinking matter among Hong Kong Secondary Students? Personality and Individual difference.

DECLARATION

I Tadele Teketel put my work here and declare that this is my original beginner study work and has not presented by any other person for award a Degree in any other higher institutions and that all materials used for this thesis has openly acknowledged.

Sign. _____ Date _____

TADELE TEKETEL LINTALE

This Thesis has been submitted for the examination with my approval as Addis Ababa University Advisor.

Sign. _____ Date _____

Dr. MULUGETA ATNAFUA

