STUDENTS' MATHEMATICS ACHIEVEMENT
AS A FUNCTION OF ATTITUDE, GENDER, PARENTS' EDUCATION
LEVEL, AND PARENTS' LOCALITY IN THE GENERAL SECONDARY
SCHOOLS OF AWI ZONE

By

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July 2007
ADDIS ABABA
Students' Mathematics Achievement as a Function Of Attitude, Gender, Parents' Education Level, and Parents' Locality in the General Secondary Schools Of Awi Zone

A Thesis Submitted to School of Graduate Studies, Addis Ababa University, in Partial Fulfillment of the Requirements for the Degree of Master of Arts in Measurement and Evaluation

By

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July 2007
Addis Ababa
ACKNOLEDGEMENTS

The researcher extends his sincere appreciation to Ato Tamirie Andualem, the research supervisor, for his guidance, encouragement, and substantive feedback during the planning and writing of this thesis.

The researcher extends his special thanks to Dr. Tilaye Kassahun (Head of Research and consultation at the ECSC) for providing valuable assistance and encouragement for the researcher in different stages of the research. The researcher is also thankful to Dr. Anbissa Kenia (AAU curriculum department), Ato Abrha Assfaw (AAU curriculum department), and Ato Mulu Nega (AAU Testing center), for their full hearted help and cooperation showed to the researcher during the early stage of this study.

Special thanks are also extended to Ato Mekuriaw Anagaw (Head of Awi Zone Education Department), and Ato Almaw Triuneh (Head of Awi zone Road and Transport Office), for their keen interest in my work and unreserved help during the data collection process.

The researcher is also grateful to Ato Abebe Tiruneh (Expert at the ECSC), for his strong encouragement and sacrifice of his time and comfort in encoding and entering data in SPSS.

The researcher is also thankful to Ato Tayachew Ayalew (Expert at MOE), for scarifying his time and comfort in editing the manuscript.
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ACRONYMS

AAU- Addis Ababa University
CERTWID- Center for Research and Training of Women Institute Department
ECSC- Ethiopian Civil Service College
EMPDA- Education Materials production and Distribution Agency
ICDR- Institute for Curriculum Development and Research
IDR- Institute of Department of Research
IEJME- International Electronic Mathematics Education
UNICEF- United Nation International Children’s Emergency Fund
ESLCE- Ethiopian Schools leaving Certificate Examination
MOE- Ministry of Education
TGE- Transitional Government of Ethiopia
UK- United Kingdom
UNESCO – United Nation Education, Science and Culture Organization
ABSTRACT

The main purpose of this study was to investigate the effects of gender difference, attitude towards mathematics, parents' education level, and parents' locality in relation with their mathematics achievement of high school students. To this end, an extensive review of the available literature was made. The review was focused on four factors (i.e. gender, students' attitude towards mathematics, parents' educational level, and parents' locality) and mathematics achievement. Based on review of related literature, basic research questions were constructed and framed. Three selected general secondary schools of Awi zone were used as a source of data for this study. The study used mathematics achievement test and questionnaire as instruments of data collection. The questionnaire and mathematics achievement test were administered 240 students (120 males and 120 females) of grades nine and ten that were chosen based on simple random sampling techniques. The responses of the students and the results of documentary detailed examination have been analyzed and interpreted. Major statistical techniques, such as t-test product moment correlation coefficient, and multiple regressions were applied for data analyses. Results of the analyses indicated that mathematics achievement was related to gender, mother's education level mathematics attitude, father's education level and parents' locality with statistical significance. All of these five variables together explain about 47.3 percent of mathematics achievement, with gender 36%, with mathematics attitude 4.3%, with mother's education level 5.7%, with father's education level 1.2%, and with parents' locality 0.1% among grade nine students. Further, mathematics achievement was related to gender, mathematics attitude, mother's education level, father's education level, and parents' locality with statistical significance. All of these five variables together explain about 44.8 percent of mathematics achievement, with gender 35.6%, with mathematics attitude 8.7%, with parents' locality 0.4% and with mother's education level 0.1% among grade ten students.
CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Learning mathematics has become initial for individuals and societies to adjust in this fast changing world assisted by science and technology. In addition to this, knowledge of mathematics is essential for all members of society. To be unrestricted in career choice and advancement, people must also be able to understand and apply mathematics ideas. Unfortunately, certain groups are not achieving enough courses.

Being established an advanced society; a well-designed educational program should be implemented accordingly. Because of this, the intended teaching-learning process could be effective and thereby students can exhibit good academic achievement.

Encouraged by such benefits of education the Ethiopian Government like other African governments has taken a series of measures. Among these measures the New Education and Training Policy, which was launched in 1994 by the Transitional Government of Ethiopia (TGE, 1994), strongly addresses such an issue. Following the issuance of the policy, school enrollments have been expanded manifold and girls have more access to schooling than before; new schools have been established. This had led to a dramatic change in the structure of the country’s educational system.

In spite of such concerted efforts exerted by the government, the country’s education sector has been confronted with a number of challenges, one of which is the multi-faced impediment of differences among students in their mathematics achievement. In line with this,
different researchers at different times came up with their own factors as to how student's mathematics achievement could be hindered or facilitated. Among them students' attitude towards mathematics, parents' educational level, parents' locality, and gender are cases in point.

The day-to-day observation of school records show that there is remarkable gender difference in mathematics and science subjects at various levels of educational setting (MOE, 1999). Substantiating this viewpoint, Assefa (1991) on his study of primary school students in various locations in the country indicated that girls tend to perform lower than boys in mathematics and science subjects do. Similarly, Genet (1991) discloses that girls had performed very unsatisfactorily in mathematics and since subjects in Ethiopian school leaving certificate examination (ESLCE) at the national level. Similar results were obtained from the findings of Seyoum (1986). In addition, research findings (e.g. Keynes, 1989, Sanders, 1985) indicated that mathematics performance differs by sex towards the latter part of primary education.

Fennema (1977) pointed out that there is no sex related differences in elementary school children's mathematics achievement. However, she found little evidences in that there is a sex differences in mathematics achievement of high school learners. Differently, Costello (1991) pointed out that girls in primary schools achieve better than boys in mathematics test items.

These controversial findings of gender differences in mathematics initiates for further investigation.

Another variable that hinders or facilitates school achievement is parental level of education. As noted by Maccoby and Jacklin (1974), parents having higher educational level are likely to create an advantageous environment and conducive atmosphere, and provide their children with special resources and opportunities, which enhance their children's academic achievement.
Besides, Ookes (1990) noted that the educated parents serve as a role model and mentors in encouraging their children to aspire. Parents’ education is the most important predictor of participation in mathematics and science (Berryman, 1983).

It has been suggested that the relationship between mathematics achievement and attitude is significantly stronger for boys as compared with girls (Neale et al., 1969, Hilton and Berglund, 1974, Schofield, 1982).

Similarly, some investigators (e.g., Hilton and Berglund, 1974, Aiken, 1976) have concluded that differences in achievement in mathematics are frequently found to favor boys over girls at the junior high school level.

Differences in mathematics achievement are attributed to a number of factors such as parents’ locality, parental bias, and stereotypes favoring males, mistreatment of teachers and lack of personal confidence in mathematical ability (Fennema and Sherman, 1978, Keynes, 1989). Most girls’ experience very low self-confidence towards their mathematics learning. Their positive view of mathematics learning deteriorates as they ascend through the hierarchy of schooling. Therefore, such negative images towards girls’ mathematics learning adversely affect their performance in the subject. Unless these constraining factors are investigated thoroughly and possible solutions are listed, all efforts directed towards gender equality may end in vain.

That is exactly what this research has been designed for. Particularly, the major concern of this research is to conduct a survey on students’ performance in mathematics at the general secondary school of Awi zone.
1.2. Statement of the Problem

Some studies conducted in different countries and in different parts of Ethiopia other than Awi zone in the last few years have established that sex differences, parents' education level, parents' locality, and students' attitude influence mathematics achievement of students. Therefore, it is a peak time for anyone to raise the question "does this result hold true in schools of Awi zone." If so, the causes of low performance and the efficacy of different methods that improve the situation need to be studied in a very systematic way. The current study therefore, has been initiated to address such issues. To this end, in respect to investigation of the problem, the researcher formulated the following basic questions that are to be answered during the data analysis.

1. Is there a significant difference between boys and girls in their mathematics achievement?

2. Does parents' education level contribute to difference on students' mathematics achievement?

3. Is there a significant difference between urban and rural students in their mathematics achievement?

4. Is there a significant association between mathematics attitude and mathematics achievement?

5. To what extent is mathematics achievement explained by gender, parents' education level, attitude, and parents' locality?
1.3 Significance of the study

This study is expected to provide necessary evidence regarding how gender, attitude, parents' education level, and parent's locality affects students mathematics achievement. Therefore investigating such issue at local level is timely and essential in order to determine the degree of its influence on mathematics achievement. This would help to suggest possible remedial solutions that may help to minimize its negative consequence and to improve the students' achievement in mathematics.

More specifically, the results of this study have been envisaged to be significant in the following aspects:

1. The finding could be of vital importance for subject teachers, counselors, curriculum designer, educational personnel, students, and other concerned bodies to devise the appropriate measures in minimizing or overcoming the difficulties observed in learning mathematics and to minimize the gap if it exists between male and female students in mathematics achievement.

2. This study could serve as a necessary input for those who are interested to conduct further research in this area.

1.4 Organization of the Study

This section comprises six chapters. Chapter 1 explains about the background of the study, statement of the problem, objectives of the study, significance of the study, definition of important terms and delimitation of the study.

In chapter two, the researcher presents review of the related literature. The review focuses on four sets of major factors (i.e. attitude, parents’ educational level, parents’ locality and gender) that are thought to influence mathematics achievement.
Chapter three explain the research methodology. It mainly deals with the main points, such as variables of the study, sampling of the study, sampling procedures, the instrument used, the procedure employed for data collection and analysis.

In chapter four, the results of the study are presented under sub-headings which include the background of the respondents, gender difference in mathematics achievement and attitude, parents’ education level on students mathematics achievement parents’ locality on students mathematics achievement, students mathematics attitude and achievement, correlates of mathematics achievement and predictors of students’ mathematics achievement.

Chapter five comprises the discussion part of the finding.

Chapter six is the last chapter and comprises summary, conclusion and implications.

1.5 Limitation of the study

The limitation of this study is that achievement test prepared for each respective grade (i.e. grade 9 and 10) were not covering all contents of mathematics syllabuses. Because of that, the test was administered in March 2007 and the contents were to be covered in last of June 2007. The other limitation is the scarcity of ready-made localized test instrument, particularly, on attitude scale.

1.6 Operational Definition of Important Terms

According to their usage in the study, the following terms are defined in the manner stated below:

Achievement: refers to pupils’ mathematics performance as shown by the investigator based on the mathematics syllabus and contents of the textbooks of grades 9 and 10.
**Attitude:** refers to pupils' feeling about mathematics especially their likes and dislike associated with mathematics activities in and out of the school as collected by Likert type scale adapted by the investigator.

**General Secondary School:** the second level of general education from grade 9 to 10.

**Gender (Sex):** is used interchangeably to refer to the division between male and female, or boy and girl.

**Gender differences:** refer to the differences between boys and girls in their mathematics achievement.

**Illiterate:** one who cannot read and write

**Literate:** one who can read and write

**Mathematics Achievement:** performance in mathematical tasks.

**Parents' educational level:** refers to the educational status of their parents or guardian.

**Parents' locality:** refers to location of parents.

**Sample Schools:** Those schools from which sample students will be drawn.
CHAPTER TWO

REVIEW OF RELATED LITERATURE

One of the critical duties of a researcher is to browse into the existing literature associated with his or her problem of study. This helps to base his or her discussion in light of existing theoretical knowledge or argue against the same.

Accordingly, this section of the thesis takes the available academic literature written on the issues related to the present study. Consequently, the major topics that gained particular emphasis in this section include gender differences in mathematics achievement, students' attitudes towards mathematics, and mathematics achievement parents' education level on students' mathematics achievement, and parents' locality on mathematics achievement. An attempt has been made to discuss the literature from different perspectives.

2.1. Gender differences in Mathematics Achievement

Many studies revealed that sex has an effect on academic achievement. A study made by Heynema (1980) reveals that an individual's sex has been found to be one of the major factors associated with academic performance and powerful predictor of achievement differences. His study further explains that the higher performance among boys could not be explained by chance and the differences must have deep-rooted reasons from society. Neale (1969, Brimer and Pauli (1971), Fennema and Sherman (1980) and Heyneman (1980) reported that the differences in academic performance between males and females seems more social based than being biological.
Many researches attributed gender differences in mathematics achievement due to different factors, such as biological, sociological, cultural etc. Fennema and Sherman (1978) and Becker (1981) suggested that the stereotyping of mathematics as a male domain is due to differences in treatments of parents and teachers between boys and girls.

Huntley (1997) pointed out that male superiority has long been attributed to the differences men and women think about the world around them. Others stated that the males' mathematical superiority is due to psychological process such as stereotyped sex-role identification.

In another slightly different study, it has been reported that research evidence has repeatedly indicated that girls tend to perform better than boys in working areas that require verbal ability while boys tend to perform better than girls in tasks requiring science and technology skills (Maccoby & Jacklin, 1974). In support of this, a study conducted on standards of achievement in science at ages 11, 13 and 15, and in technology at age 15 in UK shows that the performance of boys was higher than girls on problems set in industrial did and laboratory context.

Similar studies, which have been conducted in Africa FAWE (1997), revealed that a significant gender difference was recorded in science and mathematics achievement in favor of males against females. The marked differences in science subjects have been observed from Grade 4 onwards (Maccoby & Jacklin, 1974). Similarly, the longitudinal study, conducted by Hilton and Berglund (1974) using data from educational testing service to investigate gender differences in mathematics achievement on the sample of 1859 grade five, seven, nine and eleven students, revealed that boys' mathematics achievement was higher than that of girls at grade seven, nine and eleven but not grade five. Substantiating this, Fennema, Carpenter, Chipman et al., (1985), Fennema, Eccles & Parson (1984), reviewed that at the high school level, male students' achievement was at
a higher level in mathematics than female students were.

Similarly, Sadker, Sadker & Kelin (1991), Kimball and Friedman (1989) reviewed that differences in mathematics achievement favoring males are not typically found prior to high school. In high school, differences favoring males are common, particularly in the areas of problem solving and application.

Regarding this some of the studies conducted in Ethiopia (e.g., Seyoum, 1986, Anbassu & Junge, 1988, Assefa, 1991, Nema & Wanger, 1993) have also revealed the existence of pronounced differences between male and female students achievement in science and mathematics. Particularly, Assefa (1991) on his study of primary school students in various locations in the country indicated that in almost all the sample grades he considered, boys had performed better than girls in mathematics had. Besides, Tilaye (2004) in his study of primary school students in Addis Ababa found that the achievement level of girls in grade 6 mathematics was lower than that of boys. Another achievement study conducted by Bedru & Tilaye, (2001) found that the achievement level of girls in grades 6 and 8 science and mathematics were lower than that of boys in Addis Ababa schools. Similarly, Genet (1991) discloses that girls have performed very unsatisfactorily in science and mathematics subjects in the Ethiopian school leaving certificate examination (ESLCE) at the national level similar results were obtained from the findings of Seyoum (1986).

In another study, Nema and Wagner (1993) which was conducted on 208 students in grades 2, 3, 4, and 5 in Western Shoa and Eastern Gojjam, found that in all the sample grades the male students' achievement level in mathematics is better than that of the female students. Supporting this, Sewenet (1995) examined the influence of gender and other factors up on mathematics, reading and writing achievement tests of 5th grade.
pupils. As a result, he found out that the average mathematics score was significantly better for boys than for girls.

Likewise, Seleshi (1995) who conducted study on grade eight, nine, ten and eleven students in North showa, showed that in all grades significant gender differences in mathematics achievement was observed in favor of boys. In addition to this, Genet (1998) who conducted a study on sample of 1,965 female students in Addis Ababa high school showed that female students’ examination score in government school was poor in all subjects especially in mathematics course. The recent study of Amero (2005) on 380 students in Dessie high school revealed that there was a significant gender differences in mathematics achievement in favor of boys. Accordingly, Adamu(2004) who conducted study on 448 students in South Western Shoa Zone, found that there was a significant gender differences in mathematics achievement in favor of males.

On the other hand, Fennema (1977) pointed out that there is no sex related differences in elementary school children’s mathematics achievement. However, Fennema (1980) reviewed thirty-six studies and found little evidences that there is a sex differences in mathematics achievement of high school learners.

Differently, Costello (1991) pointed out that girls in Primary school achieve better than boys in mathematics test items. Similarly, recent studies that have challenged the findings by showing the superiority of girls in mathematics performance. For instance, Felson and his Collogue (1991) pointed out that girls tend to do better in mathematics than that of boys in high school level on both of the regents examination and on examinations designed by their teacher.

Brandon’s, et al., (1987) study in Hawaii revealed that girls’ mathematics achievement at grade ten was better than that of boys.
The study conducted at elementary and secondary school grade levels found inconsistent findings, and vary from country to country. Therefore, these controversial findings of gender differences in mathematics would initiate for further investigation.

The aforementioned paragraphs confirm that there seems a remarkable gender differences in the achievement of mathematics. Because the accumulated weight of research evidence happens to support the view that from among all the areas of the curriculum, mathematics is depicted, as the one in which girls perform low and lag behind, and it is also the one, which they do not want to join for further studies. Such paramount difference in academic performance between boys and girls could emanate due to a number of factors, which would be addressed and/or treated in the forthcoming section.

Table 1 Summary of Findings of Gender difference in Mathematics Achievement

<table>
<thead>
<tr>
<th>Study</th>
<th>Difference</th>
<th>Kind of Sample</th>
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<tbody>
<tr>
<td>Domestic Study</td>
<td></td>
<td></td>
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<tr>
<td>Sesyoum (1986)</td>
<td>Favor males</td>
<td>Primary school students</td>
</tr>
<tr>
<td>Anbassu and Jung (1988)</td>
<td>Favor males</td>
<td>Primary school students</td>
</tr>
<tr>
<td>Assefa (1991)</td>
<td>Favor males</td>
<td>Primary school students</td>
</tr>
<tr>
<td>Genet (1991)</td>
<td>Favor males</td>
<td>students who take ESLCE</td>
</tr>
<tr>
<td>Nama &amp; Wagher (1993)</td>
<td>Favor males</td>
<td>Grade 2,3,4 and 5 students</td>
</tr>
<tr>
<td>Swenet (1995)</td>
<td>Favor males</td>
<td>5th grade students</td>
</tr>
<tr>
<td>Seleshi (1995)</td>
<td>Favor males</td>
<td>Grade 8,9,10,and 11 students</td>
</tr>
<tr>
<td>Yoseph (1997)</td>
<td>Favor males</td>
<td>Grade 6, 7 and 8 students</td>
</tr>
<tr>
<td>Genet (1998)</td>
<td>Favor males</td>
<td>High school students</td>
</tr>
<tr>
<td>Bedru &amp; Tilaye (2001)</td>
<td>Favor males</td>
<td>Grade 6 and 8 students</td>
</tr>
<tr>
<td>Tilaye (2004)</td>
<td>Favor males</td>
<td>Grade 6 students</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td>Grade or Context</td>
</tr>
<tr>
<td>----------------</td>
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<td>----------------------------------------</td>
</tr>
<tr>
<td>Adamu (2004)</td>
<td>Favor males</td>
<td>Primary school students</td>
</tr>
<tr>
<td>Amero (2005)</td>
<td>Favor males</td>
<td>High school students</td>
</tr>
<tr>
<td><strong>II Other Country Study</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maccoby &amp; Jacklin (1974)</td>
<td>Favor males</td>
<td>Students of grade 4 onwards</td>
</tr>
<tr>
<td>Hilton &amp; Brglund (1974)</td>
<td>Favor males</td>
<td>Grade 7, 9, and 11 students</td>
</tr>
<tr>
<td>Fennema, Eccles &amp; Parson (1984)</td>
<td>Favor males</td>
<td>High school students</td>
</tr>
<tr>
<td>Fennema, Carpenter, Chipman (1985)</td>
<td>Favor males</td>
<td>High school students</td>
</tr>
<tr>
<td>Kimbal &amp; Friedman (1989)</td>
<td>Favor males</td>
<td>High school students</td>
</tr>
<tr>
<td>Sadker, Sadker &amp; Kelin (1991)</td>
<td>Favor males</td>
<td>High school students</td>
</tr>
<tr>
<td>FAWE (1997)</td>
<td>Favor males</td>
<td>High school students</td>
</tr>
<tr>
<td>Costello (1991)</td>
<td>Favor females</td>
<td>Primary school students</td>
</tr>
<tr>
<td>Felson &amp; his Colleague (1991)</td>
<td>Favor females</td>
<td>High school students</td>
</tr>
<tr>
<td>Brandon's, et al. (1987)</td>
<td>Favor females</td>
<td>Grade 10 students</td>
</tr>
</tbody>
</table>

### 2.2. Students Mathematics Attitude and Achievement

#### 2.2.1. Students' Attitude towards Mathematics

Attitude is recognized as salient factor in the study of mathematics achievement (Dutton, 1956 and Callanhan, 1971).

Aiken (1970) defined attitude as a learned predisposition or tendency on the part of an individual to respond positively or negatively to some object, situation, concepts, or another person. Taking this point McLeod (1992) defines; an attitude as a tendency to respond positively, that is favorably, or negatively, that is, unfavorably, to certain objects, persons, or situation. McLeod further discovered that a favorable attitude of an
individual implies a positive tendency towards a given situation, which involves acceptance and liking; and on the other hand, a negative attitude towards a given situation indicates a tendency of rejecting or disliking of the situation.

Tekeste (1990) as cited by Yoseph (1997) presented evidence in support of the trend for positive attitude towards learning and the achievement of education objectives. Tekeste further remarks that students’ attitude is an important factor to apply their potential to receive education. As positive attitude towards learning facilitates students’ progress in school, a negative attitude is a hindrance to students’ successful progress in schoolwork. The value one attaches to school learning influences students’ effort, which, other things being equal, may determine their success or failure. According to Rossi (1969) a positive attitude towards schoolwork, he argues, helps students attain higher achievement scores.

Precisely, Fasil, (1975) as cited by Yoseph (1997) suggested that achievement differences among students may, partly, be explained by affective states as attitudes, motivation, self perception, intentions and expectation.

From the foregoing discussion, it can be deduced that an interest and positive attitude towards school and learning will likely improve achievement. In the area of mathematics, the relationship between attitude and achievement has been found to be interactive and dynamic.

Some investigators are interested in the attitudes of students towards a specific subject. For instance, educators like Hernandez & Socas (1999) revealed that attitudes toward mathematics are particularly important, because they are related to mathematics performance in both sexes. After reviewing a number of studies (e.g. Reyes, 1984 & Aiken, 1985) reported that children’s positive attitude towards mathematics likely tend to perform the task and even look for opportunities to do it. Whereas a
negative attitude will cause them to dislike the subject and have less inclination to make the effort to improve their mathematics abilities. The majority of the research also reciprocally indicates that poor attitudes towards mathematics are related to lower level of achievement in the subject. Substantiating this Kabir and Kiamenas (2004) examined the relationship among the factors on students’ attitude toward learning mathematics, students’ creativity and students’ school grade and the effect on achievement in mathematics. Finally, they found out that the best predictor among the variable was the students’ attitude toward learning mathematics.

Similarly, (Hembre, 1992), Mathews, (1984), and Reyes (1984) found that attitude is an important factor to learn and perform well in mathematics because it has a significant positive correlation with mathematics achievement.

Besides, Seleshi (1995) and Yoseph (1997), Kabir and Kiamenas (2004) found that students who performed better on mathematics test tend to have positive attitude toward mathematics.

Thus, one would expect that a student’s attitude toward mathematics would be important in determining his or her achievement in the subject.

2.2.2. Gender Differences in Attitude towards Mathematics

The following findings concerning gender differences in attitudes towards mathematics will be discussed briefly.

In a comprehensive cross-sectional study, Norman (1977) administrated an attitude scale to 197 randomly selected students of grades 2, 6, 7, 8, 9, 10 and College. The researcher’s main objective was to assess the developmental course of gender differences in attitude towards mathematics and to pinpoint precisely the point of origin of significant differences. Employing unweighted means of analysis of variance, he
found significant gender differences in favor of boys from grade 9 on. Males have better attitudes towards mathematics from grade 6 on as compared to girls, though the differences were not significant. Further, the researcher reported that favorable attitudes showed consistent decline between both sexes from grade 2 to college levels. IEJME (2006) assessed attitudes toward mathematics involving 346 from schools 13 to 18 years. They were drawn from six secondary schools. The investigator concluded that gender differences that pupil attitude towards mathematics achievement varied according to gender. Hilton and Burglund (1974) examined gender difference longitudinally. They found that more males than females were interested in mathematics and perceived it as useful, whereas more female than male reported that mathematics was boring to them. Such a significant difference was, however, evident among student of grades nine and eleven but not among students of grade seven. In another study, Sherman (1980) found no gender differences although such differences were observed when the same students reached the eleventh grade.

With regard to the Ethiopian context, Seleshi (1995) conducted a study that involved 847 students in grade 8 to 11 in Northern Shoa region and he found no gender differences in attitudes towards mathematics among eighth grades. However, he found significant gender differences in favor of boys at subsequent grade levels (9, 10, and 11).

Some studies have employed sub-scale measures of attitudes toward mathematics. Fennema and Sherman (1978), for instance, examined gender differences among 1320 middle school students (grade 6, 7 and 8). They found significant differences favoring males on two sub-scaled (confidence in learning mathematics and stereotyping of mathematics as male domain) in all grades, but no significant gender differences were found in any of the grades on the remaining six sub-scale (usefulness of mathematics, attitude towards success in mathematics, effect once
motivation in mathematics, the perceived attitude of father, mother, and teacher toward one as a learner of mathematics.)

On the other hand, Akinnuli (1982), Eshiwani (1983) and Aghenta (1989) have found the overall attitudes are partially responsible for girl's low or poor participation in mathematics and science.

By the same token Aiken (1976) concluded in his review as follows, although some studies have failed significant gender differences in both attitude and achievement frequently do favor boys over girls at the junior high school level. Moreover, beyond gender differences were found in confidence and stereotyping mathematics as a male domain in the late elementary school. Investigators (e.g. Aiken, 1970, Callahan, 1971 and Aiken, 1976) have generally agreed that attitude towards the learning of mathematics becomes increasingly less favorable beginning from the late elementary and early junior high grade for both boys and girls.

2.2.3. Causes of Gender Differences in Attitudes and Achievement in Mathematics

The main reason for gender differences in mathematics achievement and attitudes emanate from the interplay of personal, social, cultural and institutional factors (e.g. FAWE, 1997, Fuller, 1987, Genet, 1991, Keynes, 1989, Rosser, 1995 and UNESCO, 1984). For example Keynes (1989) reported that different expectations of parents, school teachers, counselors, peers and community as a whole in patriarchal society, which favors males, plays a detrimental role in girls performance in mathematics. Further, research has also succeeded in proving that, more often than not, majority of girls do not show interest in learning mathematics as they think it is a masculine subject (Fox, 1981). Research has documented that girls happened to be less confident in school mathematics ability than boys were. Their confidence even deteriorates as they climb up the ladder of schooling (Fox, 1981). However, educational
researchers like Brimmers and Pauli (1971) pointed out that lack of self-confidence in a given subject curtails one's effort and seriously hampers the person's achievement in the subject. In this study, an attempt was made to assess causes of gender differences in attitude and mathematics achievement, and a host of other related views. These have been explained in the section that follows.

In connection with parent's role, the available literature abounds that parent’s preference to their sons’ success and more support to them influences daughters’ school performance in general and their mathematics achievement in particular (FAWE, 1997, Genet, 1991, and Seyoum, 1986). Research findings that support this position indicate that parents often think mathematics as more important and appropriate for boys than for girls (Fennema and Sherman, 1977) and as more difficult for girls than for boys (Fox, 1981).

Parents communicate their belief to their children in different ways such as offering more rewards that are explicit and reinforcement to their sons for learning mathematics than to their daughters (Fennema and Sherman, 1976).

Moreover, Fennema and Sherman (1978) have reported that boys perceived both of their parents as more positive towards them as learners of mathematics than did girls. This difference has been reported to be observed, although not significant in middle school (grades 6-8) and to become significant in high school (grades 9-12).

Another critical factor, which was found to influence students' attitude towards mathematics has stated from teachers' bias, while teachers treat boys and girls differently in mathematics classes and that this differential treatment reinforces the sex typing of mathematics as a male domain (Fennema, 1980, Fox, 1981, Jacobsen, 1985). By observing the classroom interaction between teachers and students, Robinson (1992) found that
most teachers knowingly or unknowingly tended to organize classroom discussion to accommodate male learning patterns by disregarding females' interest. Similarly, after having extensive observation of teachers' interaction in classes in France, Loudet-verdier, and Mosconi (1995) reported that teachers tend to have more and long-interaction with boys than with girls. They further witnessed that girls were asked simpler questions than boys were. These characteristics were even more accentuated in mathematics and science subjects. Similarly, after going through the experiences of different countries teacher at schools, UNESCO (1984) summarized its findings as follows:

1. Teachers spent more time talking to males and allow male students to talk more than females in classroom;

2. Girls had to wait longer for answer or assistance;

3. Teachers knew a great deal more about the boys they teach;

4. Teachers prefer to introduce topics, which are usually associated with males;

5. Majority of teachers prefer to teach boys, even though more stated it was easier to teach girls; and

6. Teachers had different expectations for males and females.

However, the differential treatments of girls from boys or low expectations of girls may lead to an erosion of confidence and development of negative attitudes towards school learning in general and towards mathematics subjects in particular. Moreover, classroom observation made by Fennema (1980) and Fox (1981) had verified the differential treatment of students by gender on the part of teachers in mathematics subjects as a male-activities. It is no wonder then that many girls score lower grades in mathematics and repeat grades many times.
Research over the last few decades has shown that historically mathematics has been a masculine discipline (e.g. Burton, 1979, Fennema, 1974, Fennema and Sherman 1976, Fox 1981). Moreover, some investigators (Fennema and Sherman, 1977, 1978) have consistently found using sub-scale mathematics as a male domain (in grades 6-12).

In addition, females seem to believe that mathematics has limited utility in their lives and it is unconnected to their mode of thinking (Fennema and Sherman,1978)

The attitudes of male students, teachers, relatives and society in general reinforce girl's low self-efficacy in mathematics ability. In this regard, the present researcher was eager to assess the opinions of students' towards mathematics, as he was very interested in knowing the level of gender stereotypes prevalent in the minds of students'.

2.3 Parents' Education Level on Students' Mathematics Achievement

The most commonly studied family background includes parents' level of education. This study has also committed itself to investigate the effect of parents' level of education in students' mathematics achievement.

Parents' educational level is likely to shape children's attitude towards education. Because educated parents know the benefits of education, they frequently send their children to school and they given support and motivate their children to score high mark. However, uneducated parents usually do not send their children to school even if they do; they frequently insist their children to dropout (Lishan, 2004).

Studies (e.g. Ross, Scott and Kelly 1996) found that the higher the level of parents' education, the better the average achievements of students. Particularly, Epstein et al. (1997) noted that parents and family in general make considerable contribution to the child’s achievement from early
childhood through high school. They further disclosed that the education level of parents' is positively related to the child's achievement. In this regard, Taylor et al. (1993) pointed out that the educational level of parents influence children's school performance more than other family related variables such as income, family size and occupation. Similarly, Stevenson and Baker (1987) showed that the educational level predicts more of the variance in students' achievement than do other family background variables, particularly for young children, Ross, Scott and Kelly (1996) found out that parents' education together with income and labor market status is associated with a variety of child outcomes, including academic achievement.

The basic assumption underlying in the parents' educational level is that literate or well-educated parents can be involved in school matters and understand the value of education. They can encourage the children better than illiterate parents (Brimer and Pauli, 1971) can. Accordingly, Morton et.al. (1998) concur that students whose parents are well educated get important materials that help in facilitating their education.

In contrast, most illiterate parents lack the ability to initiate and support their children in education as compared to the literate ones. Similarly, if parents are illiterate, it is difficult for them to secure the attendance of children in school until they complete.

More importantly, students who come from educated parents are better able to cope up with the challenges of the learning process as they have enough orientation and preparation at home. In relation to this, Loasa (1982) elaborated that children from more educated families excel at school because the teaching-learning and assessment process in schools are different from those they have learned to master at home. Grissmer (1994) indicated that students with parents who were both college educated tend to attain better at the college education.
Some researchers believe in the significance of parental education as a determinant of academic achievement, there are some who tried to differentiate the influence of the degree of parental education influence by gender. Among them Jabre (1988), Sadik (1991), and King and Hill (1993) have ascertained that the education of mother is more closely associated with the schooling of daughters, the education of fathers is more closely associated with the schooling of sons.

In addition to this, Rumberger (1983) found that parents did not have the same effect on boys and girls in different ethnic groups. He further stated that the higher the mother’s educational level, the more likely girls would achieve at school.

In another slightly different study, Chervichovsky and Meesook (1985) specifically argued that mothers’ literacy does not matter as much as the fathers’ to decide whether their daughters are provided with the necessary material and psychological support.

Still another study by Bown (1990) explained that mothers are expected to play a great role as teachers. They are the primary sources of knowledge, language, values and social relationship to the child. Therefore, the higher the educational level of the mother, the more effective she is to transmit the knowledge she acquired to her children. Similarly, Truner (1977) emphasized that maternal importance in the child’s scholastic performance is given greater place. Similarly, Stevenson and Baker also (1987) found that mothers that are more educated know more about their child’s school performance so that they more contact with teachers and were more likely to have taken action, when necessary to manage their child’s academic achievement.

Willms (1996) also found that children’s early educational performance is influenced by educational level of their mothers. He further noted that as the educational level of the person makes him/her to become
knowledgeable about the child (most often the mother) that was found to be a significant predictor of children's mathematics achievement in grade 2 and 4. Parents' level of education is also associated with the value placed on education within the family. Parents with higher levels of education tend to place a greater value on the importance of academic achievement and are likely to spend more time reading to their children and helping them do their homework.

Family's education is also the most outstanding predictor for participation in mathematics and science (Beryman, 1983, Malcom et al., 1985). The students whose families were college graduates were most likely to be successful to enter colleges. For such students the parents serve as role models and mentor in encouraging them to aspire (Oakes, 1990). The national longitudinal survey (NELS, 1988) as cited in RAND (1994) sampled eighth graders and estimated how specific family features affect student’s performance, as measured by mathematics and verbal reading scores.

Accordingly, Anick et al. (1981), Reyes and Stanic (1988) parents’ level of education, with classification based on information gathered from individual students, there was a clear positive relationship between parent education and students mathematics achievement.

Regarding with the Ethiopian context, Sewenet (1995) revealed that parents are supposed to have great effects on the overall development of personality trait of education and they can play important roles in shaping the future Career of their children. He further stated that well educated parents give more value to education and expects their children to become well educated too. When parents provide reward encouragement for the improvement of the Childs daily educational activities positive effect resulted in achievement.

Merga (1999) as well has pointed out that parents who are themselves
educated may have a more stimulating environment for the education of their daughters than uneducated parents.

Yet another study by Genet (1991) reported that in "Patriarchal" society like Ethiopia where the equality of sexes have not yet achieved, the decision on children's (for both sexes) is determined usually by husbands. Supporting this view, Chervischovisk and Meesook (1985) described that in such kind of society mother's education does not matters as father can decide on children's schooling. In this respect therefore, it is not surprising then the Ethiopian girls do score low academic achievement than their counter parts as father give premium for boys' education.

Yelfign et al (1995) have also confirmed that mother's education increases the likelihood of girls' education. Wanna and Tsion (1994) indicated that grade repetition and low academic achievement for female students are higher for those parents are illiterate than literate. Moreover, Tesfaye (1997), in his study, the impact of maternal status and success striving of female college students has shown that mother education is significantly associated with females’ success striving and gender role attitude.

2.4. Parents’ Locality on Student’s Mathematics Achievement

Sewnet (1995) pointed out that in order to enable students realize their abilities it is advisable to provide them with the necessary help from the environment as well as parents. From this point, he viewed that students who lack the necessary education related materials from their setting are expected to be trouble in associating their classroom lesson with real objects out side. This in turn might have a significant impact on their academic performance and assumed to contribute to fewer achievements. In this regard, urban students look relatively more advantageous than rural students do because of their different settings. Rural students are assumed to be deprived of certain educative elements compared with urban ones. Rural areas are less exposed to the modern technological
products. The rural areas are not appropriate to introduce modern technologies because of lack of different infrastructures. Students in rural areas had fewer economic resources to continue their education beyond high school and to suffer from their inability to compete with students from urban areas who were able to attend various after-school opportunities.

The absence of such exposure to the necessary materials creates differences between urban and rural area students educational performance. With this regard, Bloom, Davis and Hess (1965) as cited by Sewnet (1995) said that since rural students encountered difficulties with such factors, they seem to be affected in their academic performance and being polarized to less achieving individual. Sewnet (1995) in his literature review, assumed that the extent to which students exposed to education related materials in their respective setting, parental help and inherent conditions of the children put together interactively influence the students’ academic performance negatively or positively. Sewnet (1995) suggested that family’s location (urban or rural) has significant effect on student’s educational aspirations. Thus, students from rural families are at disadvantages when compared to those from urban families. Hence, geographical location of the settlement of students’ family may have an effect on mathematics achievement of the students. In contrary, his study showed that rural students’ mathematics achievement is significantly better than their urban counterparts are.

Thirunarayanan, M.O. (2004) found that there are statistically significant differences between the average achievement of students in urban and rural communities. The differences are statistically significant $F=131.550$, $P<0.01$. The $x^2$ test also show a statistically significant relationship between the student’s location and the level of mathematics achievement ($x^2=227$, $P<0.01$)
Paterson (1978) as cited by Bercinas (1991) found that adolescents from large urban communities thought more highly about themselves than adolescents from rural communities. Bercinas (1991) concluded that urban students have higher educational and occupational aspirations than rural students do.

Numerous investigators have noted that the educational aspirations of rural youth lag behind those of their non-rural counterparts (Cobb, McIntire, and Pratt, 1989, Edington, 1970, Ohledrof and Rafferty, 1982) as cited by (Haller and Virker, 1993). They stated these differences in rural and non-rural educational aspiration are due to the differences that rural students less familiar with professional and technical occupations than non-rural students and, therefore, less likely to aspire to them.

Students develop educational and occupational plans that build up on their background of experience (Odell, 1988) as cited in (MaCracken and Bercinas, 1991). Moreover, the families of which they are members, the communities in which they live, and the schools they are attend determine the life experience of secondary school students. These experiences manifest themselves in the educational and occupational expectation of students.
CHAPTER THREE
RESEARCH METHODOLOGY

This section describes the subjects included in the study, the instrument used for the study, the procedure employed for data collection, variables of the study, and methods of data analysis.

3.1. Sampling

The subjects of this study were grades nine and ten students in the general secondary schools of Awi Zone in Amhara National Regional State in 2007. The reason Awi Zone was selected as an area of this study was because it has been the researcher’s good knowledge and experience of the study area, and this helped him to make the study manageable. The researcher’s experience and observation of the problem at the high school level. Grades nine and ten students were also chosen intentionally because at this time students are in a position to decide their future career and placement of their study area.

The main study was conducted in the Awi Zone general secondary schools of grades nine and ten students.

From among the six general Secondary schools (Injibara, Dangila, Anksha, Chaginie, Tilili, and Addis Kedame), Anksha general secondary school was randomly selected for the pilot study. The pilot study, which was intended to improve the quality and contents of the instruments, was administered to a random sample of 64 grades nine and ten (32 males and 32 females) students. From the above school twelve students (4 males and 8 females) did not provide complete information for the try out analysis. In the case of the pilot mathematics achievement test, three students (1 male and 2 females) from grade nine and two students (1 male
and 1 female) from grade ten were excluded from item analysis. Similarly, in the case of the pilot attitude scale test, three students (1 male and 2 females) from grade nine and four students (1 male and 3 females) from grade ten were excluded from item analysis. Thus, the sample for the pilot study consisted of fifty-nine students (30 males and 29 females) for the mathematics achievement test and fifty-seven students (30 males and 27 females) for the attitude scale test.

In the main study from among the six general secondary schools found in the zone, three general secondary schools (Dangila, Injibara, and Tilili) were selected randomly for this study.

To obtain the sample schools, the names of the six general secondary schools of the zone under consideration were put into alphabetical order. Thereby consecutive number 1 to 6 were assigned. Thereafter, using lottery methods of random sampling technique three general secondary schools were selected (see Appendix A). Besides, sections were also selected in the same way.

In the present study, it was decided to take equal sample size of female and male students from the total population of Grades nine and ten students in the three general secondary schools. The number of the sample size for this study was determined following the table developed for such purpose by Krejcie and Morgan (1970).

The target population of this study was both male and female. Regular students (3265 males and 2436 females from grade nine, and 2313 males and 2229 females from grade ten) of the three general secondary schools who were attending grade nine and ten respectively. Thus, from the total population of 240 students (120 males and 120 females) were chosen for the main study using stratified random sampling.

The sample was selected based on the proportions of girls and boys from
each school after they were separately stratified into male and female groups. However, among the selected students, thirteen students (six males and seven females) did not provide complete information to the instrument under the study. In the case of mathematics achievement test three students (1 male and 2 females) from grade nine and four students (2 males and 2 females) from grade ten were not provide complete information to the instrument under the study. Similarly, in the case of the main study attitude scale test, three students (2 males and 1 female) from grade nine and, three students (1 male and 2 females) from grade ten were not provide complete information to the instrument under the study. Owing to this, thirteen students were canceled out from the study. Thus, the main study comprised of 227 students (114 males and 113 females) 114 students (57 males and 57 females), were ninth grade, and 113 students (57 males and 56 females), were tenth grade.

The details of the sample distribution are summarized in the following table.

Table 2 Summary of sample Distribution

<table>
<thead>
<tr>
<th>School Name</th>
<th>Total No. of Section</th>
<th>No. of Section taken</th>
<th>Population Students size</th>
<th>Sample size (participants)</th>
<th>Usable (valid) sample</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gr/9</td>
<td>Gr/10</td>
<td>Gr/9</td>
<td>Gr/10</td>
<td>Gr/9</td>
<td>Gr/10</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>M</td>
<td>F</td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td>Angila</td>
<td>38</td>
<td>38</td>
<td>1</td>
<td>1</td>
<td>72.1</td>
<td>1536</td>
</tr>
<tr>
<td>Ibara</td>
<td>26</td>
<td>16</td>
<td>1</td>
<td>1</td>
<td>70.1</td>
<td>932</td>
</tr>
<tr>
<td>Ati</td>
<td>21</td>
<td>9</td>
<td>1</td>
<td>1</td>
<td>59.1</td>
<td>797</td>
</tr>
<tr>
<td>Total</td>
<td>85</td>
<td>63</td>
<td>3</td>
<td>3</td>
<td>67.1</td>
<td>3265</td>
</tr>
</tbody>
</table>
3.2. Instrument of Data Collection

The major instrument employed in order to gather the necessary data for this study has been achievement test and questionnaire.

3.2.1. Mathematics achievement test

Achievement test were used to assess students achievement level in mathematics. To this effect, based on the mathematics textbooks of grades nine and ten, objectives and contents identified, and table of specification were prepared for both grade levels separately. Accordingly, two achievement tests (each with 25 items) were constructed both by mathematics teachers and by the researcher from both grade levels based on the table of specification. All the items for both grade levels were objective types each item having four alternatives. The tests were then administered to the pilot samples for both grade levels.

Furthermore, pilot test was made in Anksha general secondary school with 64 grades nine and ten students (32 males and 32 females). The pilot test was used to identify the right items depending on item discrimination index and difficulty index. As a result, from 50 items 44 items (i.e., the best 22 items from each grade) with discrimination index above 0.20 were chosen for the final study. Most of the item difficulty index ranging from 55% to 75%. The internal consistency reliabilities if the final test as estimated by KR-20 were 0.68 and 0.80 for grades nine and ten respectively (See appendix B and C).

3.2.2. Questionnaire

To investigate students' attitude towards mathematics, Likert type five points scale both for grades nine and ten students was adapted and used. Response categories were strongly agree, agree, undecided, disagree, and strongly disagree. The response for each items were rated 1-5. The scale was composed of 20 items and they were adopted from modified
Fennema-Sherman mathematics attitude scale (1970). The items were translated from English to Amharic in order to make them understandable by the respondents (See appendix E).

For the purpose of the present study, some of the statements of the scale were slightly modified and commented by three lecturers of Addis Ababa University. Furthermore, among 20 items of the questionnaire 10 items for each which are positively and negatively stated

The attitude scale was administered to Pilot sample. The internal consistency reliabilities of the final test as estimated by KR-20 were 0.66 and 0.67 for grade nine and ten respectively based on Pilot testing, the instrument became ready for the main study (See appendix D).

In addition, the study had employed documentary analyses to gather the right information from relevant sources (i.e. schools record office).

3.3. Procedure of Data Collection

In the pilot as well as in the main study, first the mathematics attitude scale was administered. After the students completed the scale, the achievement test was handed out to those students to work on it.

Before administering the instrument, the researcher told the purpose of the instrument and gave illustration on how to fill it. Furthermore, they were informed to read the instruction carefully before starting responding to the items.

During both the pilot and the main study, to avoid cheating among students while taking the test, the classroom subject's teachers were assigned as examiner.
3.4. Variables of the Study

In this study, there are major groups of variables that subject to investigation. These are predictor/independent variables and criterion/dependent variable

1. **Predictor variables:**
   a) Gender
   b) Parents' educational level
      b.1 - Father's educational level
      b.2 - Mother's education level
   c) Parents' locality
   d) Mathematics attitudes

2. **Criterion Variable: Mathematics achievement**

In this study, the criterion variable is mathematics achievement among general secondary schools of Awi Zone.

Among the variables which have been mentioned above i.e. the respondents provided information about their gender, parents' educational level, and parents' locality are demographic variables.

3.5 **Methods of Data Analysis**

The responses of the students and results of document have been analyzed. The analyses were made with the help of statistical package for social sciences (i.e. SPSS 13.0 for windows version).

Depending on the nature of the basic research questions and the data collected, different statistical techniques have been employed for data analysis. These include the following:

1. **T-test** was computed to determine whether there is a significant
mean difference between male and female students in mathematics achievement, first semester math test score and attitude, to determine whether there is a significant mean difference between urban and rural students in their mathematics achievement, and to determine whether their exist mathematics achievement difference, or not, due to parental education level difference.

2 Inter-correlation was calculated to show the degree of relationship between various types of variables.

3 Multiple regression analysis was computed to show the joint contribution of various independent variables in predicting an associated change in mathematics achievement (i.e. the dependent variables).
CHAPTER FOUR

SUMMARY OF RESULTS

The survey findings are presented below. All descriptive and inferential analyses were conducted using the computer software called SPSS for Windows version 13.0. Data gathered from each grade level were analyzed separately.

4.1. Gender Difference in Mathematics Achievement and Attitude

The main purpose of this study was to compare the mean scores of male and female students' mathematics achievement and attitude. To attain this objective, t-test was computed and the result is presented in the following table.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Variable</th>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>Std.Dvn</th>
<th>Maximum</th>
<th>Minimum</th>
<th>t</th>
<th>df</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Mathematics Achievement test</td>
<td>M</td>
<td>57</td>
<td>11.947</td>
<td>2.689</td>
<td>17</td>
<td>10</td>
<td>7.934</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>57</td>
<td>7.526</td>
<td>3.235</td>
<td>13</td>
<td>7</td>
<td></td>
<td></td>
<td>&lt;0.05</td>
</tr>
<tr>
<td></td>
<td>First Semesters Mathematics test score</td>
<td>M</td>
<td>57</td>
<td>61.070</td>
<td>15.232</td>
<td>90</td>
<td>35</td>
<td>3.152</td>
<td>112</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>57</td>
<td>52.035</td>
<td>15.373</td>
<td>83</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mathematics Achievement test</td>
<td>M</td>
<td>57</td>
<td>42.445</td>
<td>14.982</td>
<td>100</td>
<td>63</td>
<td>3.925</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>57</td>
<td>37.186</td>
<td>5.450</td>
<td>80</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The primary interest of the present study was to examine gender differences in mathematics achievement. To see these, the means were
compared using independent samples t-test. Accordingly, gender differences in all variables were evident. As indicated in Table 2 above, the mean scores grade nine and ten male and female students shown a statistically significant difference in mathematics achievement ($t_{(112)}= 7.934, P<0.05$ and $t_{(111)}=7.838, P<0.05$) at grade nine and ten respectively. Similarly, their first semester test score differed significantly ($t_{(112)}=3.152, P<0.05$ and $t_{(111)}=7.838, P<0.05$) which again indicated that grades nine and ten male students had better first semester math test score than grade nine and ten female students. Moreover, the mathematics attitude mean scores of female and male students were also significantly different ($t_{(112)}=3.925, P<0.05$ and $t_{(111)}=2.140, P<0.05$) at grade nine and ten respectively, which still indicated the superiority of males to females on mathematics attitude.

To sum up the above results showed that female and male students differed significantly in their mathematics achievement, in their first semester math test score, as well as in their mathematics attitude, in favor of boys.

4.2. Parents' Education Level on Students Mathematics Achievement

This section deals with the results concerning the contribution of parents' education to their children's mathematics achievement. To see whether or not there exists mathematics achievement difference due to parents' education level, t-test was employed
Table 4 T-test comparison of grade nine and ten students’ mathematics means score achievement in relation with their Father's and Mother's Education Level.

<table>
<thead>
<tr>
<th>Grade level</th>
<th>Variable</th>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>Std. Devn</th>
<th>t</th>
<th>df</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Father's Education Level</td>
<td>Literate</td>
<td>16</td>
<td>12.563</td>
<td>4.5309</td>
<td>3.294</td>
<td>112</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Illiterate</td>
<td>98</td>
<td>9.276</td>
<td>3.354</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Mother's Education Level</td>
<td>Literate</td>
<td>9</td>
<td>14.779</td>
<td>1.986</td>
<td>4.626</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Illiterate</td>
<td>105</td>
<td>9.305</td>
<td>3.492</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Father's Education Level</td>
<td>Literate</td>
<td>17</td>
<td>13.529</td>
<td>3.760</td>
<td>2.859</td>
<td>111</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Illiterate</td>
<td>96</td>
<td>10.104</td>
<td>4.674</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Mother's Education Level</td>
<td>Literate</td>
<td>11</td>
<td>13.455</td>
<td>2.841</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Illiterate</td>
<td>102</td>
<td>10.314</td>
<td>4.766</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4, indicated that the calculated t value is greater than the critical value. This implies that there was a statistically significant difference between students’ mean score achievement whose fathers are at literate and illiterate level ($t_{(112)}=3.294$, $p<0.05$ and $t_{(111)}=2.859$, $P<0.05$) at grade nine and ten respectively. Besides, the above result showed that there was a statistically significantly difference between students’ mean score achievement whose mothers are literate and illiterate ($t_{(112)}=4.626$, $P<0.05$ and $t_{(111)}=2.220$, $P<0.05$) at grade nine and ten respectively.

In summary, students whose parents are literate had shown higher mean score achievement than students whose parents are illiterate.

4.3. Parents’ Locality on Students Mathematics Achievement

This section deals with the results concerning the contribution of parents’ locality to their children’s mathematics achievement. To see whether there exist mathematics achievement difference due to parents’ locality, T-test was employed.
Table 5 T-test comparison of grade nine and ten students mathematics mean score achievement by urban and rural.

<table>
<thead>
<tr>
<th>Grade level</th>
<th>Variable</th>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Parents' locality</td>
<td>urban</td>
<td>21</td>
<td>9.905</td>
<td>4.7213</td>
<td>0.229</td>
<td>112</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rural</td>
<td>93</td>
<td>9.699</td>
<td>3.4603</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Parents' locality</td>
<td>Urban</td>
<td>25</td>
<td>10.8000</td>
<td>5.6495</td>
<td>0.217</td>
<td>111</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>rural</td>
<td>88</td>
<td>10.568</td>
<td>4.425</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As indicate in table 5, the calculated value of t is less than the table value. Hence t-test showed that no statistically significant difference between urban and rural students in mathematics mean score achievement ($t_{(112)}=0.229$, $P<0.05$ and $t_{(111)}=0.217$, $P<0.05$) at grade nine and ten respectively.

4.4 The relationship of mathematics achievement with predictor variables

In this section the relationship of variables were explored. It was the second interest of the study the results of the data analyses have been summarized in table.
Table 6- Inter correlation of criterion variable and predictor variables among grade nine students (N=114)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Pearson's r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>0.600**</td>
</tr>
<tr>
<td>Father’s education level (FEDL)</td>
<td>0.279**</td>
</tr>
<tr>
<td>Mother’s education level (MEDL)</td>
<td>0.360**</td>
</tr>
<tr>
<td>Parents’ locality (PL)</td>
<td>-0.022</td>
</tr>
<tr>
<td>Mathematics attitude (MAT)</td>
<td>0.0251**</td>
</tr>
<tr>
<td>First semester Math’s test score (FSMTS)</td>
<td>0.275**</td>
</tr>
</tbody>
</table>

Note: ** correlation is significant at 0.01 level  
• (See detail appendix F)

As a summary, Table 6 seeks to examine the extent of relationship between mathematics achievements with predictor variables. It is evident from the table that out of the six variables considered in this study, five of them (i.e. gender, FEDL, MEDL, and FSMTS) were found to be positively and significantly correlated with mathematics achievements. Gender had shown moderate level of association (r=0.600, P<0.01), MEDL had established a moderately low level of association (r=0.360, P<0.01), and FSMTS, FEDL, MAT had established low level of association (r=0.275, p <0.01, r=0.279, P<0.01, and r=0.251, P<0.01) respectively. Although the four variables (i.e. FEDL, MEDL, MAT, and FSMTS) degree of association happened somewhat week, the five variables had established a significant level of direct association with mathematic achievement.

However, parents’ locality had established inverse relationship with mathematics achievement. This relationship had failed to meet a minimum level of statistical significance (r=-0.022, P>0.05). Thus, it may be concluded that gender, FEDL, MEDL, MAT and FSMTS can have a significant degree of direct relationship with mathematics achievement. However, parents’ locality may vary inversely depending on the prevailing circumstances.
Table 7 Inter correlation of criterion variable and predictor variables among grade ten students (N=113)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Person's r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>0.597**</td>
</tr>
<tr>
<td>Father's Education. Level</td>
<td>0.248**</td>
</tr>
<tr>
<td>Mother's education level</td>
<td>0.199*</td>
</tr>
<tr>
<td>Parents’ locality</td>
<td>-0.021</td>
</tr>
<tr>
<td>Mathematics attitude</td>
<td>0.372**</td>
</tr>
<tr>
<td>First Semester math test score</td>
<td>0.602**</td>
</tr>
</tbody>
</table>

Note: ** Correlation is significant at 0.01 level
• Correlation is significant at 0.05 level
• (See detail appendix F)

As a summary table 7 seeks to examine the extent of relationship between mathematics achievements with predictor variables. It is evident from the table that out of the six variables considered in this study, five of them (i.e., gender, FEDL, MEDL, MAT and FSMTS) were found to be positively and significantly associated with mathematics achievement. Gender and FSMTS had shown moderate level of correlation (r=0.597, P<0.01, and r=0.602, P<0.01) respectively, FEDL and MAT had established moderate low level of association (r=0.248, P<0.01, and r=0.372, p<0.01) respectively and MADL had shown low level of association (r=0.199, p <0.01)

However, parents’ locality had established negative relationship with mathematics achievement. This relationship had failed to meet a minimum level of statistical significance (r= -0.021, P>0.05). Thus, it may be concluded that gender, FEDL, MEDL, MAT, and FSMTS can have a significant degree of direct relationship with mathematics achievement but parents’ locality may vary inversely depending on the prevailing circumstances.
4.5. Effects of the Predictor variables on the Criterion variable

Once the relationship between mathematics achievements with the variables was ascertained, those variables that showed significant correlation with mathematics achievement have been promoted to higher-level correlation analysis (i.e. multiple regression analysis). The underlying reason for such further consideration of the variables was to pinpoint those variables that can sufficiently predict a change in the dependent variable (i.e. mathematic achievement). Table 8 and 9 depicts the summary of such analysis.

Table 8 Results of Regression Analysis on Mathematics Achievement among grade nine students

<table>
<thead>
<tr>
<th>Model</th>
<th>Variables Entered/Predictors</th>
<th>Beta Coefficient (β)</th>
<th>Std. Error</th>
<th>t</th>
<th>R²</th>
<th>ΔR²</th>
<th>F</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gender</td>
<td>0.60</td>
<td>0.557</td>
<td>7.734**</td>
<td>0.360</td>
<td>0.360</td>
<td>62.953*</td>
<td>(1,112)</td>
</tr>
<tr>
<td>2</td>
<td>Gender</td>
<td>0.55</td>
<td>0.546</td>
<td>7.402**</td>
<td>0.417</td>
<td>0.057</td>
<td>39.771*</td>
<td>(2,111)</td>
</tr>
<tr>
<td></td>
<td>Mother’s Education (MEDL) Level</td>
<td>0.25</td>
<td>0.466</td>
<td>3.313**</td>
<td>0.460</td>
<td>0.043</td>
<td>31.263*</td>
<td>(3,110)</td>
</tr>
<tr>
<td>3</td>
<td>Mother’s education level</td>
<td>0.22</td>
<td>0.53</td>
<td>3.094**</td>
<td>0.460</td>
<td>0.043</td>
<td>31.263*</td>
<td>(3,110)</td>
</tr>
<tr>
<td></td>
<td>Mathematics Attitude (MAT)</td>
<td>0.21</td>
<td>0.03</td>
<td>2.953**</td>
<td>0.460</td>
<td>0.043</td>
<td>31.263*</td>
<td>(3,110)</td>
</tr>
<tr>
<td>4</td>
<td>Gender</td>
<td>0.54</td>
<td>0.525</td>
<td>7.618**</td>
<td>0.472</td>
<td>0.012</td>
<td>24.408*</td>
<td>(4,109)</td>
</tr>
<tr>
<td></td>
<td>Mathematics Attitude</td>
<td>0.18</td>
<td>0.030</td>
<td>2.807**</td>
<td>0.472</td>
<td>0.012</td>
<td>24.408*</td>
<td>(4,109)</td>
</tr>
<tr>
<td></td>
<td>Father’s Education level (FEDL)</td>
<td>0.20</td>
<td>0.333</td>
<td>1.592**</td>
<td>0.472</td>
<td>0.012</td>
<td>24.408*</td>
<td>(4,109)</td>
</tr>
<tr>
<td>5</td>
<td>Gender</td>
<td>0.54</td>
<td>0.528</td>
<td>7.551**</td>
<td>0.473</td>
<td>0.001</td>
<td>19.369*</td>
<td>(5,108)</td>
</tr>
<tr>
<td></td>
<td>Mother’s Education Level</td>
<td>0.12</td>
<td>0.491</td>
<td>2.302**</td>
<td>0.473</td>
<td>0.001</td>
<td>19.369*</td>
<td>(5,108)</td>
</tr>
<tr>
<td></td>
<td>Mathematics Attitude</td>
<td>0.18</td>
<td>0.030</td>
<td>2.775**</td>
<td>0.473</td>
<td>0.001</td>
<td>19.369*</td>
<td>(5,108)</td>
</tr>
<tr>
<td></td>
<td>Father’s education level</td>
<td>0.20</td>
<td>0.337</td>
<td>1.603</td>
<td>0.473</td>
<td>0.001</td>
<td>19.369*</td>
<td>(5,108)</td>
</tr>
<tr>
<td></td>
<td>Parent’s Locality (PLC)</td>
<td>0.02</td>
<td>0.684</td>
<td>0.239</td>
<td>0.473</td>
<td>0.001</td>
<td>19.369*</td>
<td>(5,108)</td>
</tr>
</tbody>
</table>

Note: ** P<0.01,*p<0.05
- ΔR² = R square change
- The dependent variable is mathematics achievement

AS Shown in table 8 in the first step of the hierarchical regression, gender
has come out as the most important predictor of mathematics achievement. It explains 36 percent of the variance in mathematics achievement

\( F(1,112)=62.953, p<0.05 \). The analysis indicated that there was a significant relationship between gender and mathematics achievement of grade nine students.

In step two, the mother’s education level appeared to be the second most important determinant of mathematics achievement. The entrance of this variable into the regression model has caused the coefficient of determination (R squared) to increase to the extent of 0.417. Thus, mother’s education level can explain 5.7 percent of variance in mathematics achievement. At this stage, overall model comprising two variables (gender and MEDL) were able to explain about 41.7 percent of total variance in mathematics achievement \( F(2,111) = 39.77, P<0.05 \).

Mathematics attitude has come out to be the third most important predictor of mathematics achievement in the third step of the hierarchical regression. The entrance of this variable into the regression model has caused the coefficient of determination (R square) to increase the extent of 0.46. Thus, mathematics attitude can explain 4.3 percent of variance in mathematics achievement. At this stage, overall model comprising three variables (gender, MEDL, and MAT) were able to explain about 46 percent of total variance in mathematics achievement \( F(3,110) = 31.263, P<0.05 \). This indicated that there was a significant relation between mathematics achievements of grade nine students and a linear combination of the predictor variables (gender, MEDL, and MAT).

Father's education level had emerged as the fourth important predictor of
mathematics achievement in the fourth step of the hierarchical regression. The entrance of this variable into the regression model has caused the coefficient determination (R squared) to increase the extent of 0.472. Thus, father’s education explains 1.2 percent of variance in mathematics achievement. At this stage, over all model comprising four variables (gender MEDL, MAT, and FEDL) were able to explain about 47.2 percent of total variance in mathematics achievement ($F(4,109) = 24.408, P<0.05$). The analysis indicated that there was a significant relation between mathematics achievement of grade nine students and a linear combination of the predictor variables (gender, MEDL, MAT and FEDL).

Finally, in step five parents’ locality had emerged as the fifth important predictor of mathematics achievement in the fifth step of the hierarchical regression. The entrance of this variable into the regression model has caused the coefficient of determination (R squared) to increase the extent 0.473. Thus, Parents’ locality can explain 0.1 percent of variance in mathematics achievement. At this stage, overall model comprising five variables (gender, MEDL, MAT, FEDL, and PL) were able to explain about 47.3 percent of total variance in mathematics achievement ($F(5,108) = 19.369, P<0.05$) which indicated that there was a significant relations between mathematics achievement of grade nine students and a linear combination of the predictor variables (gender, MEDL, MAT, FEDL, and PL).

Moreover, gender, MEDL, MAT, FEDL and PL have beta values of 0.557, 0.466, 0.030, .0.333, and 0.684 respectively. Similarly, the beta values of gender, MEDL, and MAT were statistically significant.
Table 9 Results of Regression Analysis on Mathematics Achievement among grade ten students

<table>
<thead>
<tr>
<th>Model</th>
<th>Variables Entered/Predictors</th>
<th>Beta Coefficient (β)</th>
<th>Std. Error</th>
<th>t</th>
<th>R²</th>
<th>ΔR²</th>
<th>F</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gender</td>
<td>0.597</td>
<td>0.712</td>
<td>7.838**</td>
<td>0.356</td>
<td>0.356</td>
<td>61.44*</td>
<td>(1, 111)</td>
</tr>
<tr>
<td></td>
<td>Mathematics Attitude</td>
<td>0.297</td>
<td>0.035</td>
<td>4.142**</td>
<td>0.443</td>
<td>0.087</td>
<td>43.770*</td>
<td>(1, 110)</td>
</tr>
<tr>
<td>2</td>
<td>Gender</td>
<td>0.557</td>
<td>0.617</td>
<td>7.763**</td>
<td>0.443</td>
<td>0.087</td>
<td>43.770*</td>
<td>(1, 110)</td>
</tr>
<tr>
<td></td>
<td>Mathematics Attitude</td>
<td>0.292</td>
<td>0.035</td>
<td>4.042**</td>
<td>0.447</td>
<td>0.004</td>
<td>29.354*</td>
<td>(1, 109)</td>
</tr>
<tr>
<td></td>
<td>Parents locality</td>
<td>-0.062</td>
<td>0.811</td>
<td>-0.865</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Gender</td>
<td>0.565</td>
<td>0.677</td>
<td>7.800**</td>
<td>0.447</td>
<td>0.004</td>
<td>29.354*</td>
<td>(1, 109)</td>
</tr>
<tr>
<td></td>
<td>Mathematics Attitude</td>
<td>0.292</td>
<td>0.035</td>
<td>4.042**</td>
<td>0.447</td>
<td>0.004</td>
<td>29.354*</td>
<td>(1, 109)</td>
</tr>
<tr>
<td></td>
<td>Parents locality</td>
<td>-0.062</td>
<td>0.811</td>
<td>-0.856</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mathematics Attitude</td>
<td>0.292</td>
<td>0.035</td>
<td>4.042**</td>
<td>0.447</td>
<td>0.004</td>
<td>29.354*</td>
<td>(1, 109)</td>
</tr>
<tr>
<td></td>
<td>Parents locality</td>
<td>-0.062</td>
<td>0.811</td>
<td>-0.856</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mathematics Attitude</td>
<td>0.292</td>
<td>0.035</td>
<td>4.042**</td>
<td>0.447</td>
<td>0.004</td>
<td>29.354*</td>
<td>(1, 109)</td>
</tr>
<tr>
<td></td>
<td>Parents locality</td>
<td>-0.062</td>
<td>0.811</td>
<td>-0.856</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Gender</td>
<td>0.556</td>
<td>0.737</td>
<td>7.051**</td>
<td>0.448</td>
<td>0.000</td>
<td>17.391*</td>
<td>(5, 107)</td>
</tr>
<tr>
<td></td>
<td>Mathematics Attitude</td>
<td>0.297</td>
<td>0.037</td>
<td>3.975**</td>
<td>0.448</td>
<td>0.000</td>
<td>17.391*</td>
<td>(5, 107)</td>
</tr>
<tr>
<td></td>
<td>Parent's Locality</td>
<td>-0.054</td>
<td>0.884</td>
<td>-0.684</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mother's Education level</td>
<td>0.044</td>
<td>0.584</td>
<td>0.532</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Father's Education Level</td>
<td>-0.015</td>
<td>0.438</td>
<td>-0.171</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: *P<0.01, *p<0.05
- ΔR² = Square change
- The dependent variable is mathematics achievement

As shown in Table 9 in the first step of the hierarchical regression, gender has come out as the most important predictor of mathematics achievement. It explains 35.6 percent of the variance in mathematics achievement (F(1,111) =61.44, P<0.05). The analysis indicated that there was a significant relation between gender and mathematics achievement of grade ten students.

In step two, mathematics attitude appeared to be the second most important determinant of mathematics achievement. The entrance of this
variable into the regression model has caused the coefficient of determinant ion (R square) to increase to the extent of 0.443. Thus, mathematics attitude can explain 8.7 percent of variance in mathematics achievement. At this stage, overall model comprising two variables (gender and MAT) was able to explain about 44.3 percent of total variance in mathematics achievement ($F(2,110)=43.770$, $P<0.05$). The analysis indicated that there was a significant relation between mathematics achievement of grade ten students and a linear combination of the predictor variables (gender and MAT).

Parents’ locality has come out to be the third important predictor of mathematics achievement in the third steps of hierarchical regression. The entrance of this variable into the regression model has caused the coefficient of determination (R squared) to increase the extent of 0.447. Thus, parents’ locality can explain 0.4 percent of variance in mathematics achievement. At this stage, overall model comprising three variables (gender, MAT, and PL) was able to explain about 44.7 percent of total variance in mathematics achievement ($F(3,109)=29.354$, $P<0.05$). The analysis indicated that there was a relation between mathematics achievement of grade ten students and a linear combination of the predictor variables (gender, MAT, and PL).

Mother’s education level had emerged as the fourth predictor of mathematics achievement in the fourth step of the hierarchical regression. The entrance of this variable into the regression model has caused the coefficient determination (R squared) to increase the extent of 0.448. Thus, mother’s education level explains 0.1 percent of variance in mathematics achievement. At this stage, overall model comprising four variables (gender, MAT, PL, and MEDL) is able to explain 44.8 percent of total variance in mathematics achievement ($F(4,108)=21.354$, $p<0.05$). The analysis indicated that there was a relation between mathematics achievement of grade ten students and a linear combination of the predictor variables (gender, MAT, PL, and MEDL).
Finally, in step five father's education level does not show any change in R squared.

At this stage, overall model comprising five variables (gender MAT, PL, MEDL, and FEDL) was able to explain about 44.8 percent of total variance in mathematics achievement ($F(5,107)=17.391, P<0.05$). The analysis indicated that there was a relation between mathematics achievement of grade ten students and a linear combination of the predictor variables (Gender MAT, PL, MEDL and FEDL).

Besides, gender, MAT, PL, MEDL, and FEDL have beta values of 0.597, 0.297, -0.062, 0.039, and -0.015 respectively. Similarly, the beta values of gender and MAT were statistically significant.
CHAPTER FIVE

DISCUSSION

This chapter will discuss the findings of the present study in relation to some previous research findings in accordance with the following order: gender difference in mathematics achievement, parents' education level, parents' locality, and mathematics attitude and achievement.

5.1 Gender Difference in Mathematics Achievement

With respect to gender differences in mathematics achievement, the findings of the present study denoted that there was statistically significant difference between male and female students in mathematics achievement ($t(112)=7.934$, P<0.05) and $t(111)=7.838$, P<0.05) at grade nine and ten respectively. Similarly, their first semester math test score differed significantly ($t(111)=3.152$, P<0.05 and $t(111)=7.838$, P<0.05) which again indicted that grades nine and ten male students had better first semester math test score than grades nine and ten female students. Besides, gender differences in mathematics achievement account for 36% and 35.6% of the population variance.

The results of the present study happen to support the findings of previous studies by local and other country researchers. For example, Seleshi (1995), Adamu (2004), and Amero (2005) have invariably reported that there was statistically significant difference between males and female students in mathematics achievement in favor of males. Furthermore, as reported by Adamu, Tilaye and Amero gender differences in mathematics achievement appear to account 3%, 3.6% and 9.58% of the population variance respectively.

Study findings of other country researchers such as Sadker, Sadker and
Kelin (1996), Kimball and Friedman (1989) reported that differences are in favor of male achievement are not typically found prior to high school. In high school, differences favoring males are common, particularly in the areas of problem solving application. Similarly, a study conducted by FAWE (1997) revealed that a significant gender difference was observed in mathematics achievements in favor of boys. Further, Hilton and Berglund (1974) found out that boys’ mathematics achievement were higher than that of girls of grade seven, nine and eleven but not of grade five. Substantiating this Carpenter, Chipman et al., (1985), Eccles and Person (1984) reviewed that at the high school level, male students’ achievement was at a higher level in mathematics than female students did.

However, it should be noted that there are other research reports that are inconsistent with the result of the present study for grade nine and ten boys and girls. Some other studies found either girls mathematics achievement at grade ten was better than that of boys (Brando’s et al., 1987) or in favor of girls in mathematics achievement at high school level (Felson and his Colleague, 1991).

The above controversial gender related differences in mathematics achievement might not be surprising when one examines the very nature of the investigation. One possible explanation for the discrepancy between the present and the previous studies might be the condition under which studies were conducted (for instance, one might have examined different grade levels taken together and the other might have used different sample size and instrument and so on). All these should be taken into account for the inconsistency of the present result with previous findings.

5.2 Gender Differences in Attitude towards Mathematics

The result of the present study revealed that there were statistically significant differences between males and females in rating towards mathematics. When the mean differences of males and females were tested, male showed more favorable attitude towards mathematics than counter parts ($t_{112}=3.925$, $P<0.05$ and $t_{111}=2.141$, $P<0.05$) at grade nine and ten respectively.
Seleshi (1995) and Yoseph (1997) conducted a study in Ethiopia and reported that attitude differences have been observed with gender differences. Further, they concluded that male students had higher level of mathematics attitude than female students did.

A similar finding was reported by some other country investigators such as Reyes (1984), Aghenta (1989), Eshiwani (1983), Aiken (1976), and Kabir and Kiamenas (2004) found that gender differences that student attitude towards mathematics achievement varied according to gender. Especially, Eshiwani (1983) reported that girls in Kenya generally have negative attitudes that tend to depress their achievement. Substantiating this, Akinnuli (1982) and Aghenta (1989) suggested that over all attitudes are partially responsible for girls’ low or poor participation in mathematics and science.

Different researchers attributed that the main reasons for gender difference in mathematics achievement emanate from the interplay of personal, social, cultural and so on factors. Keynes (1989) suggested that different expectations of parents, school teachers, counselors, peers and community as a whole in patriarchal society which favors males, plays a detrimental role in girls performance in mathematics.

There are also researchers who identified different factors that explain why female students’ mathematics achievement is consistently inferior to that of male students. (Tilaye 2004; FAWE, 1997; Genet, 1991, and Seyoum, 1986) reported that parents’ preference in favor of their sons’ success and more support they provide to them negatively influences daughters’ school performance in particular.

A possible explanation for lower mean scores for girls in mathematics achievement probably lies in the local cultures, which generally discourage the education of girls (Genet, 1991). That is girls lower performance in mathematics achievement could be related to their life style. Since girls spend most of the time on housework activities such as cooking or caretaking of their younger siblings, the have little time for their study. Similarly, Tilaye (2004) reported that girls spend more time on
domestic activities than their counter parts (boys). Thus, such drudgeries might have contributed the girl's low performance in mathematics achievement test.

Another critical factor, which was found to influence students' attitude towards mathematics, is teachers' bias in favour of boys in classrooms (e.g. UNESCO, 1984). Regarding this, Fennema (1980), Fox (1981) and Jacobsen (1985) reported that teachers treat boys and girls differently in mathematics classes and such a treatment reinforces the sex typing of mathematics as a male domain. Substantiating this, Robinson (1992) reported that most teachers knowingly or unknowingly tend to organize classroom discussion to accommodate male learning patterns by disregarding females' interest.

5.3 Parents' Education Level on Student Mathematics Achievement

The other variable considered in this study was to examine parents' education level on students' mathematics achievement. Regarding this, the present research finding indicates that the relationship between parents' education level and mathematics achievement have established positive association with grade nine and ten mathematics achievement (See table 6 and 7). In relation to this t-test, comparison of means was computed in order to detect which parental education level significantly contributed to students' mathematics achievement. The result indicates that there is a significant difference between mean score achievement of students whose fathers are literate and illiterate ($t=(112)=3.294, P<0.05$ and $t(111)=2.859, P<0.05$) at grade nine and ten respectively. Besides, the result also showed that there was a statistically significant difference between students' mean score achievement whose mothers are literate and illiterate ($t(112)=4.626, P<0.05$ and $t(111)=2.220, P<0.05$) at grade nine and ten respectively. Hence, parents' education levels did show a significant impact on grade nine and ten mathematics achievement of students in this study. Comparison of means further showed that there were statistical significant mean achievement differences between the two groups of students due to their parents' education levels. In Ethiopian culture, children have more relationship with their mothers than with their fathers and
could easily discuss their educational problems with their mothers. In this regard, the results of the present study are consistent with the findings of the previous studies. For example, Yelfigne et al. (1995), Tsion and Wanna (1994), Tesfaye (1997) and Swenet (1995) have invariably reported that mothers’ education is significantly associated with children’s success, especially girls’ success, and children’s early educational performance is influenced by education level of their mothers.

Study findings of other country researchers such as Rumberger (1983), Willms (1996), Stevenson (1987) Bown (1990) and J abre (1988) have invariably showed that mother’s education increases the girls’ education, mother education is significantly associated with children educational performance. Parental education is the most important predictor of participation in mathematics and science (Beryman, 1983, Malcom et al. 1985). Literate parents can encourage the children better than illiterate parents (Brimer and Pauli, 1971). Further, educated parents serve as a role model and mentors in encouraging their children to have high educational aspirations (Orkas, 1990). Thus, it is no surprise if mothers’ education level influences their children’s achievement.

In summary, student’s whose parents are literate had shown higher mean score achievement than students’ whose parents are illiterate.

5.4 Parents’ Locality on student Mathematics Achievement

In this study, different variables treated and analyzed in relation with students’ mathematics achievement. Among these location of the students (i.e., urban and rural) area is the one. In fact, location of students has established inverse association with students’ mathematics achievement. This relationship had failed to meet a minimum level of statistically significance (r= -0.022, P>0.05, and r= -0.021, P>0.05) at grade nine and ten respectively.

As the general observation made for all grade nine and ten students in the subject, the location in urban or rural did not show a significant difference.

Similarly, the t-test analysis of the comparison showed that the difference between
urban and rural students was not statistically significant \((t(112)=0.229, P>0.05,\) and \(t(111)=0.217, P>0.05)\) at grade nine and ten respectively.

The results of the present study with regard to location of students happen to show inconsistency with the findings of the previous studies. For example, Swent (1995) reported that rural students are better achievers than urban students are. Besides, Barcinas (1991), Cobb, Oheledrof and Rafferty (1982) as cited by (Haller and Virker) stated that the educational aspiration of rural youth lag behind their non-rural counterparts.

5.5 The Relationship of Mathematics Achievement with Independent variables

The result of the correlation analysis indicated that gender of students was significantly and positively correlated with mathematics achievement of students \((r= 0.600, p<0.01,\) and \(r=0.597, P<0.01)\) at grade nine and ten respectively.

The results of the present study happen to support the findings of the previous studies. For example, Tilaye (2004) and Heyneman (1980) have invariably reported the existence of a positive significant correlation between gender and students' mathematics achievement.

Another demographic variable closely related is parents' education level. In this study, parents' education level positively and significantly correlated to mathematics achievement \((r=0.279, P<0.01\) with father's education level, \(r= 0.360, P<0.01\) with mother's education level and \(r=0.248, P<0.01\) with father's education level, \(r=0.199, P<0.05\) with mother's education level) at grade nine and ten respectively.

Consistent to the findings of the present study, previous research evidence has repeatedly indicated that, of the demographic variables studied, parents' education level has been found to be positively related to mathematics achievement Epstein et. al. (1997), Anik et al. (1981), Ross, Scott and Kelly (1996). Similarly, Stevenson and Baker (1987) disclosed that the educational level of parents predict more of the variance in student's mathematics achievement than do other family background
variables.

Moreover, students' mathematics attitude was positively and significantly associated with mathematics achievement \( (r=0.251, p<0.01 \text{ and } r=0.372, P<0.01) \) at grade nine and ten respectively. Consistent with it, Seleshi (1995) and Yoseph (1997) reported that students who performed better on mathematics test tend to have positive attitude towards mathematics. Similarly, studies (e.g. Hembre, 1992, Mathews and Rayes, 1984) found that mathematics attitude was directly associated with mathematics achievement. Accordingly, Kabir and Kiamenas (2004) examined students whose mathematics attitudes in negatively correlated with mathematics achievement were likely to receive low scores in their mathematics work, where as students whose mathematics attitude is positively associated with mathematics were likely to receive high score in the mathematics work.

While parents' locality was negatively correlated with mathematics achievement \( (r=-0.022, P>0.05 \text{ and } r=-0.021, p>0.05) \) at grade nine and ten respectively.

In the current study, the result of the multiple regression analysis revealed that when the five variables (i.e. gender, mother's education level, mathematics attitude, father's education, and parents' locality) were considered together at grade nine levels they contributed 47.3%. Besides, at grade ten level when the five variables (i.e. gender, mathematics attitude, parents locality, mothers education level, and father's education level) were considered together contributed 44.8% of the variation in mathematics achievement. Further, the regression analysis indicated that at all grade level gender was the first important variable in contributing to the variation in mathematics achievement than other independent variables. For instance, at grade nine out of 47.3% of the variation 36% of the variation in mathematics achievement was explained by gender of students. While about 11.3% of variance in mathematics achievement was explained by MEDL, MAT, FEDL, and PL. Moreover, gender, MEDL and MAT have appeared to be significant predictors (determinants) of variance in mathematics achievement.

Similarly, at grade ten, the regression analysis showed that out of 44.8% of the
variation 35.6% of the variation in mathematics achievement was explained by gender of students. While about 9.92% of variance in mathematics achievement was explained by MAT, MEDL, and PL. Besides, gender and mathematics attitude have appeared to be significant predictor (determinants) of variance in mathematics achievement.

In relation to the findings of the present study, previous research evidence has indicated that gender of students' was significantly better predictor of mathematics achievement (Heyneman, 1980).

A study conducted by Aghenta (1989) revealed that the attitude that one holds towards mathematics or science appears to be a powerful predictor of achievement in the respective fields.

In closing, the present study revealed that the four variables out of the five have established positive association with mathematics achievement (see Table 6 and 7) at grade nine and ten respectively. However, parents' locality has shown negative relationship with mathematics achievement. When those variables that showed relationship with mathematics achievement further treated by hierarchical regression, gender, mother's education level, and mathematics attitude at grade nine, and gender and mathematics attitude at grade ten, in these order, appeared to be the most powerful predictors of any variance in mathematics achievement.
CHAPTER SIX
SUMMAR AND CONCLUSION

In this part of the thesis, the findings of the present study have been briefly summarized. The more condensed and comprehensive statements have been offered in the form of conclusion of the findings of the present study.

6.1. Summary

The main purpose of this study is to investigate the effects of gender difference, attitude, parents' education level and parents' locality in relation with their mathematics achievement in the general secondary schools of Awi zone.

More specifically, this study has been designed to answer the following research questions.

1. Is there a significant difference between boys and girls in their mathematics achievement?
2. Does parents' education level contribute to difference on students' mathematics achievement?
3. Is there a significant difference between urban and rural students in their mathematics achievement?
4. Is there a significant association between mathematics attitude and mathematics achievement?
5. To what extent is mathematics achievement explained by gender, parents' education level, attitude, and parents' locality?

In order to find out answers for the above research questions grade nine and ten students of Awi zone were participant of the study. From the six general secondary schools in the zone, three were selected using simple random sampling technique. Finally, using simple random sampling, 240 students (60 males and 60 females from grade nine, and 60 males and 60 females from grade ten) were selected.
The study had used mathematics achievement test and questionnaire as the main data gathering tools although documentary analyses has been used as supplementary instruments to generate additional information.

Both achievement test and questionnaire were thoroughly tested in order to ascertain its validity and reliability (see chapter three).

The collected data were analyzed using the following statistical techniques, such as the independent simples t-test, product moment correlation coefficient and multiple regressions.

The major findings of such analyses are briefly summarized below

- T-test results showed that there was statistically significant difference between male and female students in mathematics achievement, attitude, and in first semester math test score. Males scored significantly better than females in mathematics achievement, in first semester math test score and attitude in both grade levels.

- T-test result also showed that a statistically significant difference of Students mathematics achievement due to the variation of their parents education level in both grade level.

- T-test results showed that there was no statistically significant differences between urban and rural students mathematics achievement at grade nine and ten respectively.

- The present study has also attempted to examine the extent of association between mathematics achievement, and predictor variables (i.e., gender, father's education level, mother's education level, parents' locality, and mathematic attitude). The results of the data analyses revealed that each predictor variables (i.e., gender, father's education level, mother's, education level, and mathematics attitude) had positive and significant relationship with mathematics achievement and also gender, mother's education level and
mathematics attitude did show statistically significant association with mathematics achievement. However, parents' locality did show negative association with mathematics achievement at grade nine levels. On the other hand, the correlation result revealed that the following predictor variables (gender, father's and mother's education levels, and mathematics attitude) had positive and significant relationship with mathematics achievement, and gender and mathematics attitude did show statistically significant relationship with mathematics achievement. However, parents' locality did show negative association with mathematics achievement at grade ten level.

- Finally, the results of multiple regression analysis revealed that when five variables (i.e. gender, mother's education level, father's education level, parents' locality, and mathematics attitude) were considered together they contributed 47.3 percent of the variation in mathematics achievement at grade nine level. At grade ten level when the five variables (i.e. gender, mathematics attitude, parents' locality, mother's education level, and father's education level) were considered together contributed 44.8 percent of the variation in mathematics achievement. Further, the regression analysis indicated that at all grade levels gender was the first important variable in contributing to the variation in mathematics achievement than other independent variables. (i.e., 36% and 35.6 %) at grade nine and ten respectively. Moreover, gender, MEDL, and MAT have appeared to be significant predictors of variance in mathematics achievement at grade nine level. At grade, ten level gender and MAT have appeared to be significant predictors of variance in mathematics achievement.

6.2. Conclusion and Implications

Gender related differences were found in mathematics performance and attitude. This indicated that grade nine and ten male students have better mathematics performance and higher attitude than grade nine and ten female
students.

2 Gender, parents' education level and mathematics attitude are more and closely related to mathematics achievement as compared to parents' locality and play a vital role in the learning of mathematics.

3 Though parents' locality seems to have inverse relationship with mathematics achievement, its contribution cannot be undermined as far as mathematics achievement is concerned.

4 Gender, MEDL, FEDL, MAT, and PL, either collectively or separately, accounted for the variance in mathematics achievement of grade nine and ten students. Here gender was found to be the most important predictor of mathematics achievement. However, this does not mean the five-predictor variables are the only variables that affect students' mathematics achievement. Instead, other variables, which were not included in the present study, have accounted for much of the variance of mathematics achievement.

5 MAT has not only statistically significant prediction power on mathematics achievement but also predicts mathematics performance which indicates that one's attitude may be as important as one's knowledge of the subject matter in performing a special task.

Finally, the present findings seem to have the following implications.

1 The responsible bodies like, curriculum designers, counselors, school administrators and teachers should strive to address the existence of gender difference in mathematics learning and work cooperatively in order to minimize the gap of mathematics performance between male and female students.

2 Teachers as well as school administrators should give attention to female students to observed female mathematics role models so that their belief of mathematics as the male domain subject could be changed.
3 Mathematics teachers in particular, other subject teachers, counselors and school administrators in general, could try to understand the level of self-confidence of their students. Since it has an important role to low or extremely high self-beliefs of students can be identified as early as possible. Based on this appropriate remedial measures can be taken through special programs like academic oriented self-confidence enrichment programs and/or individual or group counseling service that aim at changing and building students' self-beliefs.

4 Teachers, counselors and school administrators should give attention to students specially those who come from uneducated parents in classroom activities and encourage them actively participate in classroom instruction.
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APPENDIX A

A list of the following general secondary schools (grades 9 and 10) are found in the area of the study.

1. Adiss Kidame General Secondary School
2. Anksha General Secondary School
3. Chagnie General Secondary School
4. Dangila General Secondary School
5. Injibara General Secondary
6. Tilil General Secondary School

Note: Schools numbered 4, 5, and 6 were selected at random and they are samples of general secondary schools.
APPENDIX B
MATHEMATICS ACHIEVEMENT TEST FOR GRADE 9

Instruction: Each question is followed four suggested answers. Choose the best answers and write the letter of your choice on the space provided.

Time 1 hrs.

1. What is the symbol for disjunction?
   A. V  B. ^  C. =>  D. ¬

2. If the truth-value of a compound statement is true for all possible truth-values of its components, then it is called _____________
   A. Tautology  B. Contradiction  C. Equivalents  D. logically true

3. The additive inverse of \( \frac{2}{3} \) is ___
   A. \(-\frac{3}{2}\)  B. \(\frac{3}{2}\)  C. \(-\frac{2}{3}\)  D. 0

4. The number of proper subsets of the set \{p, q, r\} is equal to ___
   A. 8  B. 7  C. 4  D. 3

5. If \( A \times B = \{ (a, m), (b, s), (c, t) \} \), then set \( B = ? \)
   A. \{a, m, s\}  B. \{a, b, c\}  C. \{m, s, t\}  D. \{c, t\}

6. What is the place value of the digit 2 in \((30201)_{four}\)?
   A. 16  B. 8  C. 4  D. 2

7. The number that immediately follows \((88)_{nine}\) is __
   A. 1000  B. 100  C. 9  D. 89

8. If \( a \triangle b = a - b \), then the value of \( 1 \triangle 5 = ? \)
   A. -3  B. -1  C. 0  D. 1

9. If \( a*b = 2ab + 2 \), then the value of \( 4*2 = ? \)
   A. 2  B. 16  C. 4  D. 8

10. The sum of \((342)_{seven}\) in base seven is _____________
    A. \((1604)_{seven}\)  B. \((650)_{seven}\)  C. \((1560)_{seven}\)  D. \((1650)_{seven}\)

11. Which one of the following numbers are arranged in their increasing order?
    A. 9, 5, 1, 0  B. 5, 1, -9, 0  C. 0, -9, 1, 5  D. -9, 0, 1, 5

12. If \( 1.5 \_ 0.01 = X \), then the value of \( X \) is _____________
    A. 0.49  B. 1.44  C. 1.49  D. None of them

13. If \( X = 2.033333 \) and \( Y = 3.43333 \) then \( X + Y = ? \)
    A. 5.46  B. 5.46  C. 5.43  D. 5.43
14. What is the standard notation for \(0.0324\)?
   A. \(3.24 \times 10^{-2}\)  
   B. \(3.24 \times 10^{2}\)  
   C. \(32.4 \times 10^{-2}\)  
   D. \(32.4 \times 10^{2}\)

15. When \((11.11)_{two}\) is changed in base ten, its value is __________
   A. 2.25  
   B. 2.75  
   C. 3.25  
   D. 3.75

16. When \(7\sqrt{5} - \sqrt{45}\) is simplified and written using single radical. It is the same as
   A. \(3\sqrt{5}\)  
   B. \(4\sqrt{5}\)  
   C. \(-\sqrt{10}\)  
   D. \(5\sqrt{3}\)

17. The simplified form of \(15\sqrt{27}\) is
   A. \(5\sqrt{3}\)  
   B. 9  
   C. 15  
   D. 27

18. When we rationalize the denominator of  
   \[
   \frac{21}{3 + \sqrt{6}}
   \]
   we obtain:--
   A. \(21\sqrt{3} - 6\)  
   B. \(7(6 - \sqrt{6})\)  
   C. \(7(3 - \sqrt{6})\)  
   D. 1

19. If \(n(A \cap B) = 6\), and \(\Omega (A) = 8\), then \(n(A \cup B) = ?\)
   A. 18  
   B. 14  
   C. 12  
   D. 10

20. Which one of the following is IRRATIONAL number?
   A. 3.1040611111111......  
   B. \(\sqrt{2}\)  
   C. 0  
   D. \(\sqrt{2}\)

21. If \(A \cap B = \{-1, 0, 1\}\) and \(B \cap C = \{-2, -1, 0\}\), then \(B \cap (A \cup C)\) is equal to
   A. \(\{-1, -1\}\)  
   B. \(\{-1, 0, 1, 2\}\)  
   C. \(\{0, -1, 2\}\)  
   D. \(\{-1, 0, 1\}\)

22. Which one of the following number is not between \(\frac{1}{4}\) \(^{1/3}\)
   A. \(\frac{25}{96}\)  
   B. \(\frac{29}{86}\)  
   C. \(\frac{7}{24}\)  
   D. \(\frac{6}{13}\)
APPENDIX C  
MATHEMATICS ACHIEVEMENT TEST FOR GRADE 10

Each question is followed by four suggested answers. Choose the best answers and write the letter of your choice on the space provided.

_1. Which of the following statements is TRUE?
   A. (-2, 2) is a symmetric set
   B. f(x) = x^3 + 1 is an odd function
   C. f(x) = x^2 + 1 is an increasing function in its domain
   D. The inverse of F(x) = 2x + 1 is itself

_2. If 2^x \cdot 3^{x-1} = 72, then the value of x is:
   A. 1  B. 2  C. 2/5  D. 3

_3. The vertex of the parabola whose equation is -x^2 + 2x + 3 is at:
   A. (0, 3)  B. (1, 4)  C. (-1, 3)  D. (1, 2)
   C. \{ x : -3 \leq x \leq -2\}  D. φ

_4. When we solve for x in the equation 5^x = 125^{x-1} it is equal to
   A. 1  B. -1  C. 2  D. -2

_5. Which one of the following is the reciprocal of (1/n + 2)?
   A. 2n + 1  B. n + 2  C. \frac{n}{1+2n}  D. \frac{2n+1}{n}

_6. If Y = ax^2, then x in terms of y and a is
   A. a+y  B. ay  C. a+y  D. ay

_7. What is the Y-intercept of the graph of Y = 3x^2 - 5x +5?
   A. -5  B. 5  C. 3  D. 5/3

_8. Which of the relations below is not a function?
   A. \{ (-1, 0), (0, 0), (1, 0) \}  B. \{ (-1, 1), (1, -1), (0, 0) \}
   C. \{ (-1, 0), (0, 1), (-1, 1) \}  D. \{ (-1, 1), (0, 0), (1, -1) \
9. Let \( R = \{ (x, y); x + y < 2 \} \). If \((3, m) \in R\), what is (are) the possible value(s) of \( m \)?

A. \( m = -1 \)  
B. \( m > -1 \)  
C. \( m < -1 \)  
D. \( m \leq -1 \)

10. If \( f(x) = x + 4 \) and \( g(x) = x^2 - 4 \), then which of the following is not true?

A. \((f-g)(2) = 6\)  
B. \((f.g)(2) = 0\)  
C. \((g/f)(2) = 0\)  
D. \((f/g)(2) = 0\)

11. Let \( f(x) = ax - 2 \). If \( f(1) = 3 \) and \( f(-1) = -1 \), then the values of \( a \) and \( b \) respectively are

A. -7, -4  
B. 4, 7  
C. -4, -7  
D. 7, 4

12. In \( \triangle ABC \), if \( a = 10 \), \( A = 45^\circ \) and \( \sin B = \frac{1}{2} \), the length of side \( b = \)

A. 5  
B. \( 5\sqrt{2} \)  
C. \( \frac{10\sqrt{3}}{3} \)  
D. \( 10\sqrt{2} \)

13. What is the value of \( \tan \frac{\pi}{4} + \cos \frac{\pi}{3} + \cos \pi \)?

A. 0  
B. \( \frac{1}{2} \)  
C. \( \frac{\sqrt{3}}{2} \)  
D. 5/2

14. In \( \triangle ABC \), \( C = 30^\circ \) and \( a = 8 \), if \( \angle A (\triangle ABC) = 12 \) what is the length of side \( b \)?

A. 6  
B. 8  
C. 3  
D. 4

15. What is the value of \( \cos \frac{2\pi}{3} \)?

A. \( \frac{1}{2} \)  
B. \( -\frac{1}{2} \)  
C. \( -\frac{\sqrt{3}}{2} \)  
D. \( \frac{\sqrt{3}}{2} \)

16. In \( \triangle ABC \), \( A = 60^\circ \), \( B = 45^\circ \), and \( b = 4 \). What is the length of side \( a \)?

A. \( 2\sqrt{2} \)  
B. \( \frac{\sqrt{6} + \sqrt{2}}{2} \)  
C. \( 2\sqrt{6} \)  
D. \( \frac{16}{3} \)
17. In the equation $y = \tan x - 2 \cos x$, when $x = \frac{\pi}{2}$, the value of $y$ is
   A. 1  B. 2  C. -1  D. undefined

18. The leg of an Isosceles right triangle is $2\sqrt{2}$ cm. Which of the following is not true about it?
   A. Its perimeter is $4 (1+\sqrt{2})$ cm
   B. Its area is $4$ sq.cm
   C. The hypotenuse is $4\sqrt{2}$ cm
   D. The tangent and cotangent of the acute angles are equal

19. If $\triangle ABC$, $a = 5$ units, $b = 10$ units, and $B = 150^0$, the value of $\sin A$ is
   A. $1$  B. $\sqrt{3}$  C. $\frac{1}{4}$  D. $\frac{\sqrt{3}}{4}$

20. Which of the following is the inverse of $y = \frac{x-2}{3}$?
   A. $y = 3x+2$  B. $y = 2x+3$  C. $y = 3x-2$  D. $y = 2x-3$

21. The solution set of the equation $\sqrt{x+60} = x + 60$ is
   A. $\{-3, 8\}$  B. $\{-8, 3\}$  C. $\{-3\}$  D. $\{-8\}$  E. none

22. If $f(x) = 3x-1$ then $f (-1/3)$ is equal to
   A. 2  B. -2  C. -4  E. None
Dear respondent,

You are being asked to participate in a survey that intends to examine the attitudes of students towards mathematics. Therefore you are kindly asked to give your honest answer to each is voluntary and confidentiality assured. No individual data will be reported into what so even means.

Directions: Included in this survey is a serious of statement that students may have about mathematics. First, please provide the demographic information requested in part I of this survey; and proceed to part II. Please indicate in part II the degree of your agreement with each item by putting a tick mark (√) in the box against the number of your choice made from 5 to 1 (5=very strongly agree, 4=agree, 3=undecided, 2=disagree, and 1=very strongly disagree).

Thank you!

Part I: Demographic information: Answer by putting a tick mark or writing the correct answer in one of the blank space corresponding to each item.

1. School Name ___________ Woreda __________
2. Grade Level ___________ Section __________
3. Sex Female ☐ Male ☐
4. Parents' (guardians) address: Urban ☐ Countryside ☐
5. Parents' (guardians) educational level
   5.1. Educational level of your father (Male guardian)
### APPENDIX F

Table 6 Intercorrelation of Criterion variable and predictor variables among grade nine students (N=114)

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<td>Mother's Education level</td>
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<td>.393**</td>
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<td>-1.181</td>
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<td>Mathematics Achievement</td>
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<td>.107</td>
<td>.031</td>
<td>.016</td>
<td>.275**</td>
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</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed), N= 114
* Correlation is significant at the 0.05 level (2-tailed)

Table 7 Intercorrelation of Criterion variable and predictor variables among grade nine students (N=113)

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tr>
<td>Sex</td>
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<td>Father's Education level</td>
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<td>Mother's Education level</td>
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<td>.413**</td>
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<tr>
<td>Mathematics Attitude</td>
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<td>.235*</td>
<td>.101</td>
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<tr>
<td>Parent's locality</td>
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<td>-.296**</td>
<td>-.249**</td>
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<td>Mathematics Achievement</td>
<td>.597**</td>
<td>.248**</td>
<td>.199*</td>
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<td>.542**</td>
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<td>.218*</td>
<td>.281*</td>
<td>.019</td>
<td>.602**</td>
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** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed), N= 113
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<tr>
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</tr>
</tbody>
</table>

**APPENDIX E**

<p>| | | | | |</p>
<table>
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<tr>
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<td>1</td>
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</tr>
</tbody>
</table>

- Table 1: This is a table with columns and rows containing data. The table is used to present information in a structured format.

**Table 1:**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>3</td>
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</tr>
</tbody>
</table>

- Table 2: Another table with similar structure and data presentation.
a) Illiterate □  b) literate □

5.2. Educational level of your mother (Female guardian)
   a) Illiterate □  b) literate □

**Mathematics attitude scale**

**Part II: Questionnaire**: Please answer by putting a tick mark (√) in a box against the number that best represents your level of agreement (using score point from 5 to 1) corresponding to each statement. Please give your answer using the following keys:

5=very strongly agree,
4=agree,
3=undecided,
2=disagree, and
1=very strongly disagree

<table>
<thead>
<tr>
<th>No</th>
<th>Statements</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I have never liked mathematics, and it is my most dreaded subject</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I have always enjoyed studying mathematics</td>
<td></td>
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<tr>
<td>3</td>
<td>Mathematics is very worth while and necessary</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>Mathematics makes me fell uneasy and confused</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>Mathematics is dull and boring because it leaves no room for personal opinion</td>
<td></td>
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<tr>
<td>6</td>
<td>Mathematics makes me uncomfortable and nervous</td>
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<tr>
<td>7</td>
<td>I would like to spend more time in school working on mathematics</td>
<td></td>
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<tr>
<td>8</td>
<td>Mathematics is as important as any other subject</td>
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<tr>
<td>9</td>
<td>Mathematics is not important in every day lives</td>
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<tr>
<td>10</td>
<td>I am afraid of doing world problem</td>
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<tr>
<td>11</td>
<td>I never get tired of working with numbers</td>
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<tr>
<td>12</td>
<td>I detest mathematics and avoid using it at all</td>
<td></td>
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<tr>
<td>time</td>
<td>13</td>
<td>I would like mathematics much more if it were not so difficult</td>
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<td></td>
<td>14</td>
<td>Mathematics is something you have to do even though it is not enjoyable</td>
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<td>I am not motivated to work very hard on mathematics problems</td>
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<td>16</td>
<td>I am happier in mathematics class than is any other class</td>
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<td>17</td>
<td>Mathematics is more difficult for me than for many of my classmates</td>
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<td>I am interested and willing to use mathematics outside school and on the job</td>
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<td>19</td>
<td>I like mathematics because it is practical</td>
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<td>Mathematics is important to everyone’s life.</td>
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XVII