ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

GENDER DIFFERENCES IN MATHEMATICS ACHIEVEMENT AT THE SECOND CYCLE PRIMARY SCHOOLS OF SOUTH WEST SHOA ZONE

ATHESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF ARTS IN CURRICULUM AND INSTRUCTION

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ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

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LIST OF ACRONYMS

APU: Assessment Performance Unit

EGSECE: Ethiopian General Secondary Education Certificate Examination

ESLCE: Ethiopian School Leaving Certificate Examination

FAWE: Forum for African Women Educationalists

ICDR: Institute of Curriculum Development and Research

MoE: Ministry of education

MPI: Management Performance Indicator

NELS: National Educational Longitudinal Study

NOE: National Organization for Examinations

RAND: Research and Development

SDQ: Self Description Questionnaire

TESO: Teacher Education System Overhaul

TTI: Teacher Training Institution

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ABSTRACT

This study was attempted to examine gender differences in mathematics achievement and mathematics self-esteem and to explore some factors that contribute to this achievement differences in the 2nd cycle primary schools of South West Shoa Zone.

To perform this study, four mathematics tests for the respective grades 5-8, two questionnaires one for the teachers teaching mathematics Grades5-8 in the sampled Schools and the other for 480 (240 male and 240 females) students sampled from six primary schools in South West Shoa Zone. The student's questionnaire includes nine mathematics self-esteem questions adopted from Rosenberg (1965) self-esteem scale. A t-test, analysis of variance (ANOVA) and Pearson correlation coefficients were employed to analyze the data. The results indicated statistically significant gender differences (α = .05 level) in mathematics achievement in favor of males. As a whole the difference observed between urban and rural students' mathematics achievement was not significant. But it was observed that it is significant between rural males and females in favor of males. In this study the factors such as father's education level, family size, family's occupation, family's help, guide and assistance did not show a significant impact on the achievement of students included in the study. But the difference in mother's education level shows a significant difference in students' mathematics achievement. With regard to mathematics self-esteem a significant difference was observed between male and female students in favor of males. It was also observed that there was a significant positive relationship between students' positive mathematics self-esteem and their mathematics achievement. Similarly, there is a negative relationship between students' negative mathematics self-esteem and mathematics achievement.

The teacher's expectation was found to be different with gender and it was observed that they expect better participation, performance and achievement from male students while they do not expect such qualities from females. It was recommended that sensitization and awareness building activities to enable the society, family, teachers and peers have to be done against the cultural beliefs which marginalize female students. Females who are showing special talents should be encouraged and used as the role models. There should be the school guidance and counselor at the primary school so that the students could get the necessary guidance and counseling from early school level and be able to develop positive self esteem in mathematics. Teachers should be trained in a way that they could assist, help and guide female students

Introduction

1.1 Background of the Study

In the rapidly changing world and in the development of science and technology mathematics plays a vital role. In daily life and in most human activities the knowledge of mathematics is important. To understand the computerized world and match with the newly developing information technology the strong background in mathematics is critical. Emphasizing this Krutteskii (1976) as cited in Benbow and Arjmand (1990) said, the development of sciences has been recently characterized by a tendency for them to become more mathematical … mathematical methods and mathematical styles are penetrating everywhere.

Most people associate problem solving with mathematics than other school subjects. Mathematics has a wide application in natural and social sciences. Adleke (1998) pointed out, that mathematical techniques are consistently being developed to meet the changing requirements of physics, chemistry, biology, and behavioral sciences, Engeneering, and Computer science. Similarly, Setidisho (1961) as cited in Adeleke (1998) indicated that no other subject forms a strong binding force among other branches of sciences as mathematics.

Similarly Jhonson (1984) as cited in Seleshi (1995) pointed out that as society becomes increasingly technical, mathematical ability will increasingly become a highly valuable skill. Jhonson(1984) also added that children must not be constrained in a career choice nor hindered from a full and rewarding participation in society by a failure to develop these skills. Different studies disclosed that mathematics is truly the critical filter that keeps females as well as some males from many desirable professions and vocations (Fennema 1980).

Moreover, as indicated in World Bank (1995), in most countries females' participation in education at all levels is low when compared to that of males. In Higher Education Institutions, females constitute one third of the student population. Furthermore, females are proportionally smaller in number in technical fields and they study fields that most often prepare them for low economic job status. This condition is seen specially, in the developing countries of Latin America, Asia, and Africa. When we come to Ethiopia, this practice is highly observed. Gennet (1998) supported this idea and said that many females concentrated in fields such as, secretarial, home economics, nursing, and, teaching elementary schools.

In a similar way, Almaz (2001) revealed that there is a fundamental inequity in females' access to and participation in higher education of most African countries. She pointed out that these inequities are characterized by low enrollment, high attrition, poor performance, and under representation in academic staff of females as compared to males.

With regard to the distribution in academic specialization, Almaz (2000) said that females, in predominant numbers, persue academic study in traditionally "female" disciplines such as social sciences, humanities and arts, and are significantly under represented in the traditionally "male" disciplines of math, science, technology and business. For instance, data from Forum for African Women Educationalists (FAWE) revealed that, in 1999/2000 academic year, female students dominated home economics department at 90%, while they accounted only 20% of students at the Faculty of Science (Masanja et al, 2001) as cited by (Almaz, 2001). The same trend is observed At Addis Ababa University; undergraduate female enrollment in the Institute of Language Studies was 19% while it was only 7% in the Faculty of

Science. Regarding the under representation of females in academic staff, the data showed that in Ethiopia, the percentage of female academic staff in faculties and teacher training college was only 4% (Almaz, 2001).

According to the studies conducted by Anbessu and Barbera (1988); Gennet (1991); and Assefa (1991), the proportion of female enrollment is low at different levels of schooling and their achievement is significantly less than that of the males at primary and secondary levels in all subjects. MOE (1996) revealed the complexity of the disparity in academic performance between male and female students in ESLCE results. Among the students who get GPA 2.4 and above in 1994/95 ESLCE 80.54% were males while females constitute only 19.46%. Similarly MOE (2003) showed that among the students whose GPA is 2 and above in EGSECE 2002 females constitute only 27.1%. On top of that, the statistical analysis on the 2001 EGSECE (Grade10) results by NOE (2001) showed that the gender difference in achievement, among those with GPA 2 and above, 72.89% are males and 27.11% are females. The difference also observed in ESLCE (Grade 12) 2001 and among those with GPA 2 and above, 68.98% were males and 46.47% are females. It is assumed that the contribution of mathematics for this less achievement of female students is high, since mathematics has strong relationship with other subjects.

The summative evaluation conducted by Institute of Curriculum Development and Research (ICDR, 2001) indicated that the first cycle primary school pupil's achievement in mathematics was the least compared to other subjects. This supports the statement of Aiken (1970) which pointed out that the cause of more school failures is by Arithmetic than any other subject. Gennet (1991) reported that girls performed poorly in mathematics and sciences in national examinations of grade 6 and 8 between the years 1978-1987.Similarly, Sileshi (1995) and Yoseph (1997)

showed that in Junior and Secondary High Schools females' achievement in mathematics is less than males.

There were also different investigations that arrived at different conclusion during their studies of gender differences in mathematics achievement. Maccoby (1966) showed that no consistent gender differences were observed during the elementary school years. Fennema (1974) also found that there is no sex related differences in elementary school children's mathematics achievement. However, she found little evidences that there is a sex related differences in mathematics achievement of high school learners.

On top of this, Marshal (1984) and Stigler et al., (1982) showed that there is no significant sex related differences in achievement. Kruteski (1976) concluded that there was no difference between boys and girls in mathematical ability. Sydan and Weaver (1977) also reported that there is no sex difference in the ability to solve arithmetic word problems.

Ward (1979) as cited by Burton (1986) indicated that girls do significantly better than boys on questions demanding computational skills, especially when a particular style of setting out is expected and boys do better than girls in tasks concerned with measurements and problem solving. Costello (1991) pointed out that girls in primary schools achieve better than boys in mathematics test items that are relatively easy.

These controversial ideas of gender differences in academic achievement in general and in mathematics achievement in particular initiates for further investigation.

The access to and participation as well as performance of females at secondary schools and higher education is based on their performance and success in primary

schools. Their performance and success in primary schools in turn is based on their achievement of mathematics and other subjects provided at primary schools.

Thus, from the findings expressed so far , the further investigation of gender differences in mathematics achievement in primary schools has to be given due attention. Therefore, it is important to explore gender differences in mathematics achievement at the primary school level and search the critical factors that contribute to such differences if it exists.

1.2 .Statement of the Study

It is clear that Ethiopia has designed a long-term plan to address the problem of education and targeted to provide the Universal Primary Education for all by the year 2015 (ETP, 1994). This will be practical if the Problem of gender disparities is overcome. This in turn will be put into effect if the gap in participation in different fields between male and female is minimized and they equally participate in all economic, political and social aspects. Even though, the reduction of gender gap in primary enrollment is a good step much has to be done to prepare female students and enable them to participate in science and mathematics fields.

The report of National Organization for Examination (NOE, 2001) study on the Ethiopian National Baseline Learning Assessment Survey showed that the average score of grade four mathematics is 41.7% for male students and 36.5% for female students. It also showed that in all regions except Afar the rural students achieved better than urban students. This study revealed that among the four subjects (English, Math, biology & Chemistry) included in the study, grade 8 students achieve less in mathematics. Female students in this grade achieve less in all the four

subjects. As it can be observed from different research studies achievement of female is less than male at different educational level. Moreover, the participation of females in economic, social and political affairs of a country is very important and decisive. This will be practical if they are successful in their educational performance. The performance/achievement in mathematics plays a great role for their success in different educational areas. That is why Fennema (1980) mentioned that the entire field of mathematics might be enriched if more young females were given the opportunity to grow into mathematical scholars and able to play a vital role in every educational activities.

Thus, the purpose of this study is to examine the gender differences in mathematics achievement in the second cycle primary (grade 5-8) schools. If gender difference in mathematics achievement is observed at this level, the study is expected to explore some major factors that contribute to this difference and recommend some corrective measures to be taken.

Therefore, the study attempts to give solutions to the following research problems or questions

- Is there a difference between males and females' mathematics achievement in second cycle primary schools?
- Does parents' socio economic status (education of mothers and fathers, family income, family size, family occupation) contribute to the gender difference in mathematics achievement?
- Does teachers' expectation of students in mathematics achievement differ for boys and girls?

- Does student's location (rural or urban) make gender difference in mathematics achievement at the second cycle primary school?
- Is there a gender difference in mathematics self esteem?
- Is there any relationship between mathematics self esteem and achievement in mathematics?

1.3 Objectives of the Study

The general objectives of the study is to investigate the gender difference in mathematics achievement in the second cycle primary schools (grade5-8) and explore some factors that contribute to this difference. To this end, the study has the following specific objectives

- To examine differences between males and female's achievement in mathematics for grades 5-8.
- To examine whether or not the parent's socio economic status such as education of mothers and fathers , family's income, and family size contribute to the gender differences in mathematics achievement.
- To explore whether the settlement of students in urban or rural areas affect the females' mathematics achievement.
- To identify whether teachers' expectation differ for boys and girls in their mathematics achievement.
- To distinguish gender difference in mathematics self esteem and its relationship with mathematics achievement.

1.4 Significance of the Study

Mathematics is a basis for academic success of an individual. It has a wide application in different fields of natural and social sciences. Better achievement in mathematics influences students to develop positive attitude towards learning the subject. This in turn raises achievement in other areas. Moreover, achievement in mathematics helps learners to develop high order thinking skills and reasoning abilities in all other subjects. In relation to this, the study conducted by Julian Stanley (1988) as cited by Penner et al (1993) stated that truly exceptional students in mathematics tended to have advanced skills in other areas as well.

If gender differences in mathematics achievement is found as mentioned in different studies, it has to be investigated and the measure factors that contribute to the differences must be identified. In Ethiopia, this issue deserved attention and need to be explored more to mobilize the excess human power resources of both sexes on economic activities to overcome the existing critical poverty. This is possible if both male and female have equal access and performance in educational activities. This will be put into effect if boys and girls are successful in their academic studies in general and in mathematics in particular.

From this point of view, the researcher believes that the problem should be investigated to narrow down the gender disparity in mathematics achievement in second cycle primary schools. Hence, the study expected to explore the gender differences in mathematics achievement and clarify some variables that contribute to the differences if it will be observed in mathematics achievement of males and females. The finding could be of vital importance for curriculum developers, educational personnel, subject teachers and students to devise the appropriate

measures in minimizing or overcoming the difficulties observed in learning mathematics and to minimize the gap if it exists between males and females in mathematics achievement.

1.5 Delimitation of the Study

Although the problems could be observed at all educational levels and in all regions, this study is limited to the second cycle primary schools of South west Shoa zone. Among the Ten woredas in the South West Shoa Zone the study is limited to only three woredas (Woliso, Wonchi and Bacho). Of the primary schools found in these woredas only six schools (Gurura Addisalem, Ras Gobana Dache, Chitu, Dimtu, Fitewrary Habtegeorgis Aba Mechal and Awash Bune) were included in the study.

1.6 Limitation of the study

The limitation of this study is that the achievement tests prepared for each respective grade (5-8) were not covering all the contents of mathematics syllabuses. Because of that the test was administered in March 2004 and the contents were to be covered in last of June 2004. The other limitation is when students are responded to the questionnaire, they may not respond their real situation. They may respond in the other way round.

1.7 Definition of Terms

Mathematics Achievement: Students' performance in mathematical tasks.

Gender Difference: The difference between male and female in mathematics achievement.

Urban Schools: Schools established in woreda town

Rural Schools: Schools established in farmer's association

Mathematics self esteem: Students' general feeling of how good they are in doing mathematical activities. In addition, their satisfaction with their achievement in mathematics.

Urban Students: Students whose families are living in woredas or zonal towns.

Rural Students: Students whose families are living in rural areas especially in farmers' association

Housewives: Mothers who are working the household chores and are not engaged in farming, bussiness, employees, and other fields of occupation.

Region: In Ethiopian federal structure, it is the partition which is next to the federal state

Zone: It is the partition of the regions in the federal structure

Woreda: it is the partition of zones

Average: The three semester's students' average score of mathematics taken from their records.

Achievement Tests: the tests prepared for this based on the syllabuses and text books of mathematics grades 5-8

CHAPTER 2

2. Review of related Literature

2.1 Gender differences in mathematics achievement

Many studies revealed that men dominate scientific and mathematics fields. It is also widely perceived that men perform better than women in every branch of mathematics, especially higher mathematics where alleged genetically predetermined skills for male superiority (Hantley, 1997).

In attempting to explain the male advantage, researchers have looked at different factors. These are biological differences between sexes such as hormones, genes and brain organization and institutional factors such as the curriculum, the situation, the environment and participation in mathematics and mathematics related courses (Ecceles,1985; Fennema,1985; Leder,1982,1986).

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 (Aiken, 1976; Becker,1981;Burton,1986 and Walkerdine,1985), social reinforcement contingencies (Fox et al.,1979), and expectation and believes of the learner and the wider society (Leder ,1986).

Gender differences in mathematics achievement become more pronounced between the upper elementary school and the size of differences shows a significant increase during this time span (Macomb and Macklin 1974, 1978) as cited by (Eshete, 2001). In this regard, Douglas (1964) and Davie, et al (1978) as

cited by Measor and Sikers (1992) showed that girls consistently do better than boys academically through their primary education in all subjects with possible exception of mathematics. Macomb (1966) as cited by Sileshi (1995) stated that girls do better in verbal and linguistic studies while boys do better in mathematical and visual spatial problems.

The longitudinal study conducted by Hilton and Berglund (1974) as cited by Eshetie (2001) on the data from educational testing service on 1859 students from grade five, seven, nine and eleven revealed that no gender difference was observed at grade five. However, this study disclosed significant gender differences in favor of males at grade levels 7, 9 and 11.

Wey (1994) as cited by Eshetie (2001) investigated the research question of male and female students' creative thinking ability and science achievement and found that males scores higher in fluency, originality, mathematics and physics than females. The females score higher on flexibility and chemistry than male students.

Studies by Bachman (1972); Mullis (1975); Benbow and Stanley1980) as cited in Burton (1992) showed that by age 13, boys are significantly superior to girls in both their mathematical performance and their attitudes towards mathematics.

Boys and girls are differing in their learning style. Carr and Jessup (1997) found that elementary school females preferred learning in a rote fashion and were good at number, categorizing, and were perfectionists. There is also a difference between boys and girls in their strategies of problem solving. Fennema et al (1998a) pointed out that boys often used abstract strategies, showing conceptual

understanding and were more flexible in their strategies using derived facts or invented algorithms. They also showed that girls were more likely to use concrete methods such as modeling or counting strategies to solve problems. Fennema et al (1998a) reasoned that the girls who used algorithms might not have the same conceptual understanding or yield success in extension problems. This lack of conceptual understanding will hinder understanding in later mathematics classes.

Gallagher and DeLisi (1994) also found that females were more conventional than boys in their problem solving strategies. Gallagher (1996) claimed that males try different strategies other than the one modeled in the classroom when they are solving problems.

Scott-Hodgetts (In Burton, 1986) explored that gender differences in mathematics might be associated with differences in cognitive style. She said that a greater proportion of girls than boys exhibit serialist preferences and are at disadvantage when learning mathematics. According to Scott-Hodgetts (In Burton, 1986) people who are inclined to adopt a serialist approach to learning are disadvantaged when learning mathematics.

In a study which compared the performance of Singapore boys and girls in the United Kingdom, based on Ordinary Level mathematics/Syllabuses/ it was found that, on the whole, the girls were out performed by the boys (Burton 1992).The male advantage is especially pronounced among high scoring exceptionally gifted students with boys count numbering girls 13 to 1 (Benbow & Stanley 1983). They have found a significant gender differences in favor of males at grade 7, 8, 11 & 12 on mathematical precocious students.

In most countries in the western world, far fewer females than males study mathematics science and technology (Isaacson, 1989). Brandon et al (1987) in their part pointed out that the gender differences in mathematics achievement was in favor of boys in United States, while it favors girls in Hawaii. Similarly, Mathematics attainment as measured by public examination scores, in Britain showed a little gender differences at primary school level (Orton, 1992).

The Assessment of Performance Unit (APU) primary survey recorded that the differences appear at age 16. In post primary level, more boys than girls succeed in public examination taken around the age of 16. In case studies of education made in U.S.A, Germany and Japan, it was stated that traditionally, males were more likely to select math, science and engineering tracks and females were more likely to enroll in humanities or liberal arts tracks. According to this study, the efforts made to improve females' representation in mathematics related courses engineering & science was not successful.

Many boys than girls choose mathematics as one of their specialist subjects. Comparatively few females are in professions/occupations/ directly related to mathematics or dependent on mathematics qualification (Orton, 1992). On top of this, Lamb (1997) expounded that gender differences in many area of participation in school are receding, but the gap is favoring males in mathematics study in senior secondary school persists.

Similarly, Leder (1986); Macoby & Jackline (1978); Mills, Ablard, and Stumpf (1993) as cited by Sileshi (1995) reported that males achieve higher mathematics scores than do females. In relation to this Gennet (1991) pointed out that in grades 6 & 8 national examinations given in the years 1978-1987, females poorly

performed in mathematics and science. Furthermore, she stated that girls performed unsatisfactorily in mathematics in ESLCE. Likewise, Sewnet (1995) on his part found significant gender differences in mathematics achievement in favor of boys while he was investigating factors affecting scholastic achievement of fifth graders in East Gojam. Bedru and Tilaye (2001) also found gender differences in mathematics achievement at grade four in favor of boys. These further confirmed with studies conducted on junior and secondary high schools by Sileshi (1995) and Yoseph (1997) regarding attitudes towards mathematics. The results of their study showed gender differences in mathematics achievement in favor of boys. Similarly, Atsede (1991) study also showed gender differences in science and science related courses. The study of Bahru (1999) on gender differences in academic self-esteem and success expectation on math and verbal tasks in TTIs of Oromia showed gender differences in mathematics achievement in favor of males.

Mekasha (2000) found that female students' academic achievement was less than their male counterparts. According to Mekasha (2000) the factors that affect the academic achievement of female pupils could be lack of study time and lack of encouragement both at home and at school. Almaz (1992) also pointed out that girls are discouraged to develop traits that will enable them to achieve, compete and win for these are not deemed necessary for the stereotyped roles of housewives and mothers. In different to this, Sewnet (1995) found that pupils who got low educational support from their families achieve better than those pupils who got high family educational support with mean achievement scores 17.14 and 15.34 respectively.

There were also different investigations that arrived at different conclusion during their studies of gender differences in mathematics achievement. Maccoby (1966) showed that no consistent gender differences were observed during the elementary school years. Fennema (1974) also found that there is no sex related differences in elementary school children's mathematics achievement. However, she found little evidences that there is a sex related differences in mathematics achievement of high school learners.

On top of this, Marshal (1984) and Stigler et al (1982) as cited in Habtamu (1996) showed that there is no significant sex related differences in achievement. Cruteski (1976) concluded that there was no difference between boys and girls in mathematical ability. Sydan and Weaver (1977) also reported that there is no sex difference in the ability to solve arithmetic word problems.

Ward (1979) as cited by Burton (1986) pointed out that girls do significantly better than boys on questions demanding computational skills, especially when a particular style of setting out is expected and boys do better than girls in tasks concerned with measurements and problem solving.

Costello (1991) pointed out that girls in primary schools achieve better than boys in test items that are relatively easy. She suggested that this is because easy items demand carefulness and girls are careful than boys in responding to the items.

Girl's mathematics achievement in the elementary grades is equal to boys but start to decrease in the middle school (Callahan, & Clements, 1984; Dossey et al., 1988). Similarly, an analysis of math achievement of twelfth grades girls in 15

countries showed that girls were less successful than boys (Hanna, Kundiger & Larouche, 1990) as cited in (Burton, 1990). This decline of female achievement is the result of a strong pattern of socialization to mathematics success or failure rather than to gender differences in innate ability (Callahan & clements, Dossey, Mulis, LIndiquist, & Chambers, 1988). As girls progress through school, they are less likely to continue their math education, either taking courses that are more rudimentary or dropping the subject all together (Pallas & Alexander, 1983).

2.2 Self-esteem and Academic Achievement

Self-esteem is the experience of being competent to cope with the basic challenges of life and of being worthy of happiness (Branden, 1987). Purkey(1988) also stated that self-esteem refers to the totality of a complex, organized, and dynamic system of learned beleifs,attitudes and opnion that each person holds to be true about his/her personal existence. Branden (1987) explains that the basic challenges of life include being able to earn a living and take independent care of our selves in the world. Branden (1987) also noted that positive self-esteem is necessary because it is the immune system of the sprit, helping an individual face life problems and bounce back from adversity and hence it is critical during the turbulence of adolescence. The same author expressed that self-esteem built up on the experience of success and through these experiences the individual's self-confidence is grew up. As individual experience success, they develop the capacity to cope with whatever life throws their way. This leads to further growth of self-confidence, self-reliance and self-esteem. Similarly, Lawrence (1981) as cited by Bahiru (1999) argued that high self-esteem is closely related to higher success. Moreover, self-esteem affects the academic achievement of individuals (Bandura, 1977; Marsh, 1990; Marsh et al.,

1985; Skaalvik, 1990; Skaalvik & Rankin, 1990) as cited by Bahiru (1999). In this regard, Costello (1991) pointed out that success in learning mathematics relies heavily on earlier experiences and activities. Construction of toys, practical work, familiarity with technology and a variety of games are all accepted as useful in this respect. Girls are less likely to come with the benefits of this background, and yet relatively little attempt has been made to rethink the mathematics curriculum to make better use of girls experience.

According to Huit (1998), self-esteem generally refers to how we feel about or how we value ourselves. Franken (1994) stated that the self-concept gives rise to possible selves and possible selves create the motivation for behavior. Franken (1994) added that people who have good self-esteem have a clearly differentiated self-concept. When people know themselves they can maximize outcomes because they know what they can and cannot do. Self-concept is not innate, but developed through the individual interaction with the environment and reflecting on the interaction (James, 1890; Brigham, 1986). They stated that self-concept is developed and maintained through the process of taking action and then reflecting on what we have done and what others tell us what we have done.

A number of studies have examined the relationship between self-esteem and academic achievement (Chang, 1976; Skaalvik, 1983; Williams, 1973; Coopersmith, 1967; Bachman and O'mally, 1977) as cited by Solomon (1999). Using Grade point Average (GPA) to measure achievement, they found that grades are positively associated with self-esteem.

Bachman and O'Malley (1977) as cited by solomon (1999) pointed out that educational success is positively correlated to self-esteem. Their eight years

longitudinal study showed that the higher the level of education a respondent eventually attained, the higher was his/her self-esteem through out the course of study. Self-esteem is a fundamental need that influences one's accomplishments, interactions with others, achievement patterns and mental health (Battle, 1981) as cited by Solomon (1999). Battle also stated that self-esteem is significantly associated with personal satisfaction.

Steveens in Hamcheck (1995) explored the relationship between self-esteem and academic achievement, and found that positive feeling about the self-are associated with good academic achievement. Similarly, Purkey (1970), Maqsud (1983) and Felker (1974) as cited by Efrem (1999) reported that academic achievement is significantly related to self-esteem. However, he found that there is no significant direct effect of academic achievement on student's self-esteem. Other studies by Brookover, et al (1964) and Wylie (1979) as cited by Efrem (1999) found higher correlation between academic achievement and self-esteem.

Contrary to the above, the study conducted by Muller, Foster and Wooden (1982) cited by Solomon (1999) indicated that students matched on verbal and non verbal intelligence test scores but differing in SE test score did not obtain

different level of academic achievement. For instance, Mboya (1989) as cited by solomon (1999) found no significant relationship between global SE and academic achievement in a sample of African American children.

There are also different studies that reported no correlation or limited correlation between academic achievement and self-esteem (Maruyana, Rubin and Kingsbury, 1981; Pottebaum, 1986; Walkin and Austilla, 1980). Pottebaum (1986) found no

siginificant relationship between self-esteem and academic achievement. Similarly, Maruyana et al (1981) found little influence of achievement on self-esteem. They explained that neither achievement nor self-esteem exert any causal influence on the other. Other researchers stated that there is a reciprocal relationship between academic achievement and self-esteem. Pope et al (1988) stated that there is strong relationship between positive self-esteem and high grade points in the school. Brookover et al (1964) as cited in Efrem (1999) found that changes in school performance and self-esteem were correlated with changes in grade point average.

Academic self-esteem refers to the evaluation of the self in general and specific subject areas. It is typically measured by the degrees to which a person endorses various evaluative statements about the self in academic situations (Baumeister & Tice, 1985; Marsh, 1990; Marsh, et al., 1985; Skaalvik, 1990; Skaalvik & Rankin, 1990) as cited by (Bahiru 1999). According to Baumeister & Tice (1985) as cited by Bahiru (1999) persons who score high in self-esteem are those who focus and emphasize their abilities, strengths and good qualities where as persons who score low in self-esteem are those who focus and emphasize their deficiencies, weaknesses, and bad qualities.

Academic self-concept is related to how well we do in school or how well we learn. There are two levels of Academic self-concept, the general academic self -concept and specific content related self-concept. The general academic self-concept related to how good we are overall and specific content related self-concept describes how good we are in math, science, language arts, social sciences, etc. Marsh (1992) showed that the relationship of academic self-concept to school achievement is very specific. Marsh said that general academic achievement measures are related

moderately to academic success while specific measures of subject-related self-concepts are highly related to success in that content area. Hamacheck (1995) also asserted that self-concept and school achievement are related.

2.3 Gender Differences in Mathematics Self Esteem.

In spite of their equivalent or even superior performances, females are less inclined to pursue an education in math -related fields. Russel (1983) stated that girls are not encouraged to opt for mathematical studies even when their ability and interest in the subject is at best. Russel also pointed out that girls and boys regard themselves differently in their mathematical ability.Girls underestimate their potential whereas boys tend to over estimate. Boys display confidence about their ability of mathematics, which is some times not justifiable whilst girls, perhaps with better test results, display unjustifiable anxiety.

The primary reason that the females are afraid of the math courses is the fear comes from the low self esteem, rather than lack of ability (Hechat and Hechat, 1996). The discrepancy between high and low self-esteem may arise either from differential levels of ability or differential patterns of selective perception and memory (Baumeister & Tice, 1985) as cited by (Bahiru 1999).

According to the different studies made on the specific content related self-concept, gender differences in math self-concept were not large in the elementary school years. However, the girls have lower level of math self-concept in junior and senior secondary school years (Meece, Parsons, Kaczla, Goff & Baarnes, 1985). Similarly, Self Description Questionnaire (SDQ) research found no gender differences in math

self-concept for pre adolescents, but found significant ($p < 0.01$) differences favoring boys in high school (Marsh, 1986).

Meece et al (1982) reviewed that as students go through their junior and senior high school years their math self-concept declines, but this decline begins sooner and is larger for girls than for boys. Even though, girls generally perform as well as boys in the standardized test of math achievement during their elementary and junior school years the gender differences in math self-concept occurs. With this regard, Marsh, Smith and Barnes (1985) asserted that the girls had significantly lower math self-concept than boys even when their actual mathematics school performance or achievement equals or surpass that of boys. Another study With SDQ, Relich (1983) in Bahru (1999) demonstrated that sixth grade girls had significantly lower math self-concept than did boys even though the girls had significantly higher levels of mathematics achievement

Bahiru (1999) concluded that there is no significant gender difference in the general academic self-esteem. However, the few difference observed was in favor of boys. He also concluded that male mathematics self-concept is higher than female mathematics self-concepts. The male students' expectation of success is significantly higher than the female students in mathematics tasks. Furthermore, Bahiru (1999) showed that male students achieved better than female students in all measures related to mathematics tasks.

Eshetie (2001) revealed that the boys had more confidence in their performance of mathematics and superior in mathematics achievement than girls. He also showed that students who had more confidence to solve math problems were superior in math performance than those who had low confidence to solve math problems.

Eshetie (2001) additionally showed that boys surpassed girls in their rate of math self-efficacy than girls in solving math problems.

Boys' expectations about their academic performances are often higher than girls' expectations(Crandall,1969;Harter,1981;Stipek&hoffman,1980;Wilgard,Ecceles,Maclever,Reuman&Midgley, 1991) as cited by (pressley&McCormic,1997). These sex-biased differences about academic achievement expectation negatively influence girls' willingness to pursue some challenging academic arenas compared with boy's willingness to do so.

Veroff (1969) stated that children achieve to gain social rewards. This motive is `internalized in the later development stage of males while females do not progress into the later stage. Therefore, males achieve because they want to achieve, where as females achieve, if at all, because they want social approval. This follows that in situations where achievement may conflict with social approval, females will not perform as well as males. Veroff also stated that the female child usually receives less encouragement for independence; thus, she learns to be dependent and caries in to adult life an affiliate need that may impede achievement strivings. For females who have developed both high levels of achievement motive and high dependency needs, these dependency needs may present a conflict. She may find herself in approach-avoidance type conflict and may withdraw from intellectual striving with a resultant decrease in academic performance. Therefore, those with lower dependency needs may have less of a conflict and perform better.

Neal (1969) as cited in Seleshi (1995) revealed that, many students seem to fear, even hate mathematics. Crukshank (1988) as cited in Sileshi (1995) indicated that a large number of elementary school children suffer from mathematics anxiety.

Therefore, there is a need to change children's attitude towards mathematics. Deborah (1995) concluded that females had a low self-esteem and were dependent on others, especially their family members for encouragement and confidence.

Many students wrongly perceive themselves on their ability of mathematics. They fear and even hate mathematics and limit themselves from performing mathematical activities. Regarding students' interest towards the subject Solomon (1995) stated that more boys seem to like mathematics while more girls than boys preferred language.

Meyer and Koehler (1990) identified five components that affect up on gender differences and the learning of mathematics. These include, confidence, the perception of the usefulness of mathematics, beliefs pertaining to the perception of mathematics as a male domain, the fear of success, and attribution style.

Pedersen et al (1985), Fennema &Sherman (1977) concluded that self-confidence has strong correlation with achievement. According to Fennema, one has to do those things that one feels confident to do and to avoid activities that arouse anxiety. Fennema and Sherman (1977) found that gender difference in mathematics achievement and in self-confidence is in favor of males. Furthermore, Badgger (1981) reported that, the fact that girls were significantly less self confident in their mathematical ability before they showed any signs of poorer performance tends to confirm the influence of this variable on performance.

Many studies showed that so many people consider mathematics as a male domain and a subject studied by male. Koehler&Fennema (1982) claimed that individuals tend to do those things that they perceive as appropriate for their gender. Such

perception negatively affects females' motivation to do well in the subject and hence affect their achievement.

Isaacson (1989) suggested that if girls believe that engagement in mathematics is inappropriate for females, then her success in the subject might conflict with her perception of appropriate sex-role fulfillment. Further more, Koehler and Fennema (1982) pointed out that individuals may fear sanctions from others if they perform opposite sex stereo typed activities. In relation to mathematics, females fear social rejection if they excel in mathematics, while males will be pressured into doing well. With regard to the fear of success Leder (1992) pointed out that the fear of success is consistent with the lower confidence expressed by females in relation to their mathematical ability and their greater tentativeness with regard to the appropriateness of participating in mathematics may ultimately, result in their lower performance in the subject.

Mathematics, well taught, may have an influence on children's general attitude to learning that ways of tackling problems in other situations are influenced for good by mathematical training. The reasoning skills that characterize good problem solving are important in many contexts. Therefore, the understanding gained from mathematics education research about general problem solving skills has broad implications (Pressley &McCormic 1997).

2.4 Socioeconomic status

The family's socio-economic status (SES) influences the family's educational support and interest in education that, in turn, influences the child's interest to school and willingness to study hard. Among the parental and family factors affecting pupil's

scholastic achievement, a family's SES is regarded as the most decisive factor (Derese et al., 1990). Alexander and Simons (1975) as cited by Derese et al (1990) reported that the pupil's SES is the major determinant of his/her academic achievement through out all levels of schooling except in the upper secondary grades.

Heynmen (1976) as cited in Sewnet (1995) pointed out that children of lower economic background might perform less well on tests of academic achievement.

There are different factors that contribute to the poor females' performance in general. Sintayehu (1998) indicate that the academic achievement of students is not only a function of the student's ability but also the environmental factors that students are living in. These factors could be biological, social and economic. Giddens (1996) stated that the social and family background, the school environment as well as students themselves influences school performance in general. The family background such as the education of mothers and fathers, family income and family size play a great role in children's performance. Socioeconomic status (parental occupation, education and income) accounts for the substantial difference in mathematics achievement (Ekstrom et al., 1988).

2.4.1 Parents' Influence of student performance

A family plays a great role for the successful achievement of students at all levels of education. However, the role of family is very crucial in the case of female students in terms of moral and material supports. Families are supposed to have great effects on the overall development of personality traits of children. They play an important role in shaping the future career of their pupils (Sewnet, 1995).Similarly Powney

(1996) pointed out that parental aspirations and expectations are key factors in the progress of the child both at school and in later life. In a similar way Gennet (1998) stated that, most parents treat their sons and daughters differently in regard their future roles, expectations and education. Boys are encouraged in ways that will enable them to achieve, compete and win, while girls are discouraged to develop such traits. Such encouragement helps the boys to develop the sense of competitiveness in their educational endeavors (Macomb, 1963) as cited by (Gennet, 1998)

Peers can positively or negatively affect each other's academic performance. The students who had friends whose grades were high; who spent more time on homework, who had greater educational aspirations, and who devoted more time to extra curricular activities become more successful in their academic performance (Steinberg, 1996). Nevertheless, female students have less opportunity or no chance for all these. Because their labor is needed at home to help their mothers, in house hold chores. Parents have a role to guide their children in selection of peers and arranging the study time and place.

Steinberg also concluded that student's school achievement is more dependent on the ways students structure their lives and on the priorities they and their parents hold than it is on the particular school students attend. He also added that parents and peers invariably influences student's success for better and for worth. It is up to parents to determine how successful their child becomes by shaping the child's attitude towards school indeed and word. Regarding this, Ballantine (1999) argued that parenting academically successful children is consistently conveying the

message that school matters, talking with and visiting school administrators, and prioritizing school performance above all activities.

Parents/family involvement improves student outcomes, although there is a variation based on students' family's cultures, ethnicity, and /or socioeconomic backgrounds. Shaver and Walls (1998) found that parent / family involvement significantly affected outcomes in mathematics and reading achievement for students of all socioeconomic level, although students from higher socioeconomic families experienced greatest improvement.

Family background characteristics have a considerable influence on participation and achievement in mathematics education. Children from poor families have less access to learning materials and educational activities, and are less likely to complete high school (Oakes, 1990a).

Perceiving mathematics as a male domain, parents give more support to mathematical learning for boys than for girls (Burton, 1990). Further more, Fennema and Sherman (1977) reported that girls report less family support for their mathematical endeavors. Such differential support could affect the mathematics achievement of females.

Various researches had shown that home based factors that include family size, Family income, parents' education, cultural aspiration and traditional beliefs all contribute to females' poor performance.

2.4.2 The influence of family income on students' performance

In low income families education of boys given high priority while education of girls given low priority. If families faced with economic hardship to bear the educational cost of books, uniforms and other expenses, they give the chance of school for boys. In this regard, Deborah (1995) reported that most parents prefer to invest on males rather than females. Similarly Paulin Rose et al (1997) pointed out that costs of learning materials, transport and clothing influences parents to send their children into school and make them to choose among their sons and daughters. Clothing for school is more expensive for girls than for boys. Girls need underwear and sanitary protection during menstruation and the unavailability of this cause to perform less or leave school at all.

Sammons et al, (1983) stated that poverty is the most obvious feature and has a clear impact on reading and math achievement of gender and ethnic groups. Children from poor areas are more likely to suffer health problems, absence from school condoned and otherwise-and attend schools in areas characterized by unemployment, high incidence of one-parent families and low resource-bases of the schools themselves. She also argued that there is a positive relationship between socioeconomic status and educational attainment

Children of low income do not perform as well as children of middle and upper income families (McCoormic & Pressley, 1997). People with lower income origins are underrepresented in the pool of mathematics majors and in professions that require mathematics competency (Maple &Stage, 1991) as cited by (McCormic&Pressley, 1997).

Students from low-income families are more likely to repeat a grade and to drop out of school than students from higher income families (Eskstrom, 1988).The lower achievement and participation of females in mathematics related careers is partially the cause of the economic problems faced by many women (Fennema & Leder, 1990). In this regard, Chinapah (1983) as cited by Derese et al (1990) staed that the monthly income is highly correlated with parent's educational and occupational background and family's life style. It also determines the amount of resources parents can devote to their children's school related needs. The mothers' income influences their capacity to contribute towards their children's education. Their ability to afford the fees and other school requirements and to give guidance might contribute towards the sustainability of females than males in school (Deborha, 1995). Deborha also reported that most parents prefer to invest in males rather than females.

The case studies of education in U.S.A, Germany and Japan mentioned the linkage between the SES and the ranking of schools, and between family's income and students' achievement. For instance in Japan attending *juku* is expensive. The inability of some families to afford the tuition considered to penalize their children in their college entrance examination. Parents with higher incomes made it possible for their children to enter professions that ensured that they, too, would receive higher incomes. According to the study, in German, Children of low-income families do not attend kindergarten and they would not enter school with an appropriate readiness to learn. As the result of poor living conditions and family support for education, a greater number of students from lower SES attend *Hauptschul*, the least demanding of the high schools and enter lower level vocational occupations (MPI, 1994). This study also mentioned that in U.S.A, schools receive nearly half of their funding,

including teacher's salaries, from local tax revenues. The study showed that schools like the families of the students attending the schools. Schools that are well supported provide greater variety of courses from which to choose. They have many more opportunities to take the courses that prepare them for the competitiveness they will face in attempting to enter high status occupations, while students in less-supported schools do not have such opportunities.

.2.4.3 Influences of the families' location on students' performance

Rath et al (1979) as cited by Sewnet (1995) stated that environment is an instrument in advancing or retarding cognitive function, which induce intellectual development in learners. They also said that environmental deprivation and absurd use of available educational materials influence negatively the intellectual development of students. They also said that environmental deprivation and absurd use of available educational materials influence negatively the intellectual development of students.

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 lessons 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) study reviewed 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.

Paterson (1978) as cited by Bercinas (1991) found that adolescents from large urban communities thought more highly about themselves than adolescents from rural communities. Barcinas (1989) as cited by Barcinas (1991) concluded that urban students have higher educational and occupational aspirations than rural students

do. Bercina also found that SES scores were much lower for families in rural areas than for urban areas. The educational level of the parents was higher in urban areas than in rural areas. Urban parents were more likely expect their children to advance their education beyond high school.

Numerous investigators have noted that the educational aspirations of rural youth lag behind those of their non rural counterparts (Cobb, McIntire, & Pratt, 1989; Edington, 1970; Ohledrof & Rafferty, 1982) as cited by (Haller and Virkler, 1993). These differences in rural and non-rural educational aspiration are due to the differences in occupational aspirations as well as family SES. Haller& Virker (1993) stated that family's SES has a modest relationship with a child's educational aspiration, and rural families are on average, lower in SES than are non-rural families. They also stated that rural students are less familiar with professional and technical occupations than non-rural pupils are and, therefore, less likely to aspire to them.

Students develop educational and occupational plans that build up on their backgrounds of experiences (Odell, 1988) as cited in (McCracken and Barcinas, 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.

2.4.4 The Impact of families Education Level on Students' Performance

Family's education is the most predictor of participation in mathematics and science (Beryman, 1983; Malcom et al., 1985). The students whose families were college graduates most likely successful to enter colleges. For such students the parents serve as a role models and mentors in encouraging them to aspire (Oakas, 1990a). 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. The study examines parent's level of education, family income, mother's employment status, the number of siblings, age of mothers at birth of child and single parent families, and arrived at the following conclusions.

- Students with one or two college educated parents performed significantly better than students whose parents were not high school graduates.
- A student whose family earned about $40000 annually outperformed one whose family earned only $15000 annually.
- A student with one sibling performed better than students with four siblings are.

Sewnet (1995) also stated that educated parents are aware of the benefits of educating their children. According to Sewnet, well-educated parents give more value to education and expect their children to become well educated too. When parents provide reward encouragement for the improvement of the child's daily educational activities positive effect resulted in achievement.

Paterson (1992) pointed out that cultural expectations about men and women affects the expectations and aspirations that parents have for their sons and daughters. Ramberger (1983) found that parents did not have the same effect on boys and girls in different ethnic groups. The higher the mother's education level the more likely girls achieve at school.

Powney (1996) concluded that parental aspirations and expectations are clearly linked with gender and social class and will affect pupils throughout the educational careers-the kind of encouragement pupils are given to attend schools, do their homework, choose options, presume their higher education, and employment. Even experiences before school help to determine children's self-esteem, and how they later see themselves as pupils. The study that evaluated family behaviors and characteristics and their effect on student outcomes revealed that parents/family involvement has a significant impact on student outcomes through out the elementary, middle school, and secondary years. With regard to this, Simon (1999) as cited in Carter (2003) found that although, study habits, attitudes, and behavior patterns may be set by student's senior year, an adolescent's success is influenced by his/her family even through the last year of high school. The involvement of families in their children's education depends on the family's education level.

2.4.5 The Influence of Family size on Students' Performance

Dowaney (1998) found that academic achievement among children dropped as family size grew, because parents had less time and resources for each child. Dowaney pointed out that even though parents have so much time and money, the more children they have the more these resources are diluted.

Dowaney also examined student- reported grades and scores of standardized math and reading tests and correlated the findings with parents' economic and interpersonal resources, which might be negatively affected as family size increases. Dowaney concluded that large families had the most negative consequences on children's performance.

Nuttall et al (1976) investigated the impact of family size on the academic achievement on a sample of 306 girls and 247 boys. They divide the sample into small family (2 kids) and large family (5+ kids) groups. Finally, they showed that boys from small families tended to have a better academic achievement than boys from large families, because boys in the larger families are more influenced by peer groups who tend to have anti-academic values. They also showed that academic achievement of first born girls in large families is affected more, as first born girls are more likely to learn habits of responsibility and hard work and they are learning to care for their younger siblings. First-born boys are not expected to help younger siblings as much as girls.

David W. Grssmer, Sheila Nataraj Kirby, Mark Brends and Stephanie Williamson as cited on RAND (1994) in their studies of student achievement and the changing American family took the first step to answer the question how families affect student performance. They constructed comprehensive, quantitative models for determining how family affect test score among junior and senior high students. They found that, students in families in 1990 scored higher than students in families in 1970. The reason these researchers gave for this change was the better changes come in the characteristics of parents' education and family size. They stated that parent in 1990 were better educated than their 1970 counterparts. In addition, the dramatic change

in the decline of family size was observed in the years 1970 to 1990. This decline in the family size brought about the increase in family's income per child.

When large families face problem in educating their children, they are forced to educate boys at the expense of girls' education. Even those who are aware of the importance of girls' education do so, as boys are assumed to be a "bread winners" and hence need more education than girls. In a large family size, there is a great need for girls' labor at home. They rare their younger children, help their mother in cooking and cleaning the families clothes. As the result, they lack time to do their home works, assignments, study time and discussion time with peers.

2.5. Teachers' Expectation

There are different educational environment factors, such as texts, materials, classroom organization, teachers, and physical surroundings. Among these, the teacher is the most important. All of the teacher's actions and words have a bearing, either directly or indirectly on student's learning of mathematics. For instance, the type of questions they ask, who they call on to respond to these questions, how they handle incorrect answers and how they handle requests for help can influence the interactions. Brophy and Good (1970) as cited in Fennema (1990) observed 16 seventh and eighth grade mathematics classes and concluded that male and female students are treated in different way. They found that males were asked a greater percentage of "process" or higher-cognitive-level questions while females received higher percentage "product" or lower-cognitive- level questions. They added that girls are receiving less attention from teachers than boys are. Smith (1998) pointed out that math avoidance and poor mathematics performances are due to the differences that may be occurring between male and female treatment in

classrooms. Dossey et al (1988) also pointed out that teachers challenge boys and not girls during questioning sessions. Costello (1991) stated that teachers expect certain forms of assertive behavior from boys. They react differently to good work in mathematics from boys and girls. They told a boy who does well in mathematics, as he has a real talent while they praise a girl for her hard work to produce such a good result.

According to Katherine (1992) teachers, believing that participation is an indicator of learning and are likely to ignore females because they participate less than males. The studies of Redpath & Claire (1989) and Krupnic (1985) as cited in Catherine (1992) showed that males dominate classroom discussions by speaking as much as 3-12 times longer than females. Hendrick and Strange (1989) as cited in Katherine (1992) said females classroom conduct is consonant with accepted sex-role behavior that compromises women's assertiveness. In addition, they mentioned that in comparing the participation patterns of males and females, teachers are apt to treat females' discourse contributions with less respect because females exhibit less authority. In allowing classroom discourse to parallel sex-role differences in society, teachers unconsciously pass on negative expectations for females. The reliance of teachers on teaching methods that adher to traditional norms and beliefs about gender differences , and that benefit only male students can create a cold or un pleasant learning climate for girls (Sandler,1982; Kramaerae & Treichler, 1990).

CHAPTER 3

3. DESIGN OF THE STUDY

3.1 Samples

There are Ten woredas in the South West shoa zone. Among these, three Woredas were selected using purposive sampling technique. The woreda in which the zonal center found (Woliso) was included in order to observe the impact of location in urban or rural areas on students' mathematics achievement. The other two woredas (Bacho and Wonchi) were selected based on their location on the main road from Addis Ababa to Jimma. Those woredas whose their centers were on the main road from Addis Ababa to Jimma have better infra structure services and those that are out of the main road have poor infra structure services. Thus, Bacho woreda represents those that are on the main road and Wonchi woreda represents those that are out of the main road.

From each Woredas, one urban and one rural primary school were selected. Of the Urban primary schools in the sampled woredas, the school whose media of instruction is Afan Oromo was selected in order to use the same instruments in all the sampled schools. Of the rural primary schools in the sampled Woredas one is randomly selected from each of them. From each sampled schools and each grade level (grade5-8) 20 students (10 males &10 females) were selected by employing a random sampling method on each sex. In schools, which have, greater than two sections at grade levels two sections were randomly selected. The students from both sections were sorted out by sex in each grade level. Every student whose roll number is divisible by five was selected from each sex group until the required number was reached.

A pilot study, the objectives of which were to improve the instruments and create a good working condition was carried out in two primary schools of Alemgana Woreda. One urban school whose medium of instruction is Afan Oromo (Mulugeta Gedile) was selected. From the rural primary (grades1-8) schools in the Woreda one (Atabala) was randomly selected. Thus, the pilot study was carried out on 160 students (80males and 80females) and 5 teachers teaching mathematics Grade 5-8 in these two schools. Ten males and ten females were selected from each of the four grade levels (grades 5-8). The tests were administered and the students' questionnaire was distributed to these students. Out of these 160 students, 4 males and 7 females did not provide a complete data and the pilot study comprised of 149 students (76 males and 73females) and 5 teachers.

The main study was conducted on 480students(240males and 240females) from six primary schools(Gurura addisalem, Ras Gobana Dache, Chitu, Dimtu, Fitewrary Habtegeorgis Aba Mechal and Awash Bune) and all the 17 teachers teaching mathematics grades 5-8 in these six primary schools. Complete data were not obtained from 32 subjects (18 males and 14 females), because they inappropriately responded to questionnaires or did not appear on the test. Thus, the main study comprised of 448 Subjects (222 Males and 226 Females). Similarly, two teachers did not give back their response and the study comprised of 15 teachers. The past three Semesters students' document of mathematics achievement was also used as an additional source of information.

Method: the descriptive research method was employed to conduct the study.

3.2. Instrument of data collection

3.2.1 Achievement tests

Based on mathematics syllabuses and textbooks of grades 5-8, objectives were formulated and table of specification were prepared for each grade levels separately (see appendix I for details). The preparation of table of specification has taken into consideration the time when the test is to be administered and excluded some units that are assumed not to be covered before March 15/2004. For this reason some items are included from the previous grade contents of each respective grade.

Accordingly, four achievement tests were constructed based on the table of specification. Multiple choice type items, 25 for each of grades 5 and 6, 30 for each of grade 7 and 8 were prepared. These tests were first constructed in English, and then translated to Afan Oromo, which is the media of instruction in the sampled schools. The English version was evaluated, amended and validated by the mathematics curriculum expert from ICDR and the Afan Oromo version was evaluated, amended and validated by the mathematics curriculum expert from Oromiya Region Education Bureau. The subject teachers teaching each grade in cooperation with researcher made the translations. The tests were then administered to the pilot samples from each grade levels of the two schools. The item analysis was carried out and the indices of item discrimination, the effectiveness of each destructor were analyzed on the upper 27% and the lower 27% (Mehrens and Lehman, 1984).

Based on the item analysis, items with zero and negative discrimination indices were discarded and the best 20 items were selected from each of the items for grade 5

and 6, and 25 items were selected from each of the items for grades7and8 for the final study (see appendix **II**).

3.2.2 Student's Questionnaire

It has two parts, the student's mathematics self-esteem questionnaire and questions on students and their families' background information. The first part contains closed and open-ended questions on students' background (Age, sex, education level and their location) and the families' background such as families' occupation, education level, income, family size and their involvements in their children's education. The second part contains nine mathematics self-esteem questions adopted from self-esteem measures of Rosenberg (1965) (see appendix **III** for details). Both of them were first constructed in English and then translated to Afan Oromo in order to make them clear and simple for respondents (see appendix V-VI).

3.2.3 Teachers' Questionnaires

This contains 7 open and close-ended questions used to gather information on teachers' expectation differences in mathematics achievement from male and female students (see appendix **IV** for its details).

3.3. Procedure of data collection

The sampled students were oriented how to respond to the instruments and the questionnaires were distributed to them. The teachers' questionnaire was also distributed to the sampled teachers. After three days, the questionnaires were collected and the tests were administered. The three-semester student's mathematics scores were copied from their school records.

3.4. Data Analysis

The data gathered through the above instruments were analyzed quantitatively and qualitatively. The data from achievement test and document were analyzed quantitatively. The data from questionnaires were analyzed quantitatively and qualitatively. The test scores were recorded. The mean and standard deviation of the test score were calculated. The test mean scores were analyzed using t-test and analysis of variance (ANOVA). The students mean scores were correlated with their self-esteem score, their location, families' education level, income, occupation and size.

CHAPTER FOUR

4. RESULTS

This chapter is concerned with the presentation of the analysis of the data gathered from different sources to answer the main questions raised in this study. The analyzed data is presented in five parts. The first part deals with analysis of the gender differences in mathematics achievement, the second deals with the analysis of socio economic factors, the third deals with deals with the teachers' expectation in mathematic achievement in relation to gender, the fourth deals with the analysis of gender differences in mathematics self-esteem and the last deals with the analysis of family's involvement.

4.1. Gender Differences in Mathematics Achievement

Table4.1 T-test comparison on math achievement of male and female students.

Variable	Group	N	Mean	SD	t	Df	Sig.(2tailed)	Decision
Average	Male	235	64.5377	14.9506	-5.095	468	.000	Significan
	Female	235	58.2021	11.8268				
Achievement test	Male	222	44.78	18.96	-3.866	446	.000	Significan
	Female	226	38.38	16.00				

Significant at α = 0.05

From table 4.1, for the three semesters average mathematics scores the calculated t-value -5.096 in absolute value is greater than 1.96 which was the t critical for two tailed test at df468 and α = .05. Similarly the calculated t-value for the achievement test given -3.866 in absolute value is greater than the t critical value 1.96 for two tailed test at df468 and α = .05. It could, therefore be concluded that there is a significant difference between male and female students mathematics achievement at the second cycle primary schools of south West Shoa Zone in favor of males.

Table4.2 T-test comparison on math achievement of rural and urban students

Variable	Group	N	Mean	SD	t	Df	Sig.(2tailed)	Decision
Average	Rural	351	61.07	13.52	-.885	454	.377	Not significant
	Urban	105	62.43	14.78				
Achievement test	Rural	343	41.9	18.03	.689	444	.491	Not significant
	Urban	103	40.51	17.29				

Significant at $\alpha = 0.05$

Regarding the three semesters' average mathematics scores the calculated t value -0.885 in absolute value is less than 1.96 which was the t critical value for two tailed test at Df454. Similarly the calculated t for the achievement test given 0.689 is less than 1.96 which was the t critical value for two tailed test at Df444. It could, therefore be concluded that the difference in Urban and rural students mathematics achievement is not significant at the second cycle primary schools of South West Shoa Zone.

Table4.3 T-test comparison on math achievement of rural male and female students

Variable	Group	N	Mean	SD	t	Df	Sig.(2tailed)	Decision
average	female	168	57.22	11.14	-5.344	348	.000	Significant
	male	182	64.67	14.54				
Achievement test	female	165	38.32	15.62	-3.705	340	.000	Significant
	male	177	45.40	19.36				

Significant at $\alpha = 0.05$

As shown in Table 4.3, for the three semesters' average mathematics scores the calculated t value -5.344 in absolute value is greater than 1.96 which was the t critical value for two tailed test at Df468. Similarly the calculated t for the achievement test given is -3.705 (in absolute value) is greater than 1.96 which was the t critical value for two tailed test at Df446. It could, therefore be concluded that there is a significant

difference in rural male and female students mathematics achievement at the second cycle primary schools of South West Shoa Zone in favor of males.

Table4.4 T-test comparison on math achievement of urban male and female Students.

Variable	Group	N	Mean	SD	t	Df	Sig.(2tailed)	Decision
Average	female	60	61.67	13.23	-.607	103	.545	Not significant
	male	45	63.44	16.73				
Achievement test	Female	59	39.03	17.18	-1.007	101	.317	Not significant
	male	44	42.5	17.43				

Significant at $\alpha = 0.05$

From Table 4.4, for the three semesters' average mathematics scores the calculated t value -0.607 in absolute value is less than 1.98 which was the t critical value for two tailed test at Df103. Similarly the calculated t for the achievement test given is -1.007 (in absolute value) is less than 1.98 which was the t critical value for two tailed test at Df101. It could, therefore be concluded that the difference between urban male and female students mathematics achievement is not significant at the second cycle primary schools of South West Shoa.

Table4.5 T-test comparison on math achievement of urban and rural female students

Variable	Group	N	Mean	SD	t	Df	Sig.(2tailed)	Decision
Average	rural	168	57.2247	11.14	-2.521	226	.012	significan
	urban	60	61.6708	13.23				
	rural	165	38.32	15.62	-.293	222	.770	Not significan
	urban	59	39.03	17.18				

Significant at $\alpha = 0.05$

Table 4.5 shows that, for the three semesters' average mathematics scores the calculated t value -2.521 in absolute value is greater than 1.96 which was the t critical value for two tailed test at Df226. Similarly the calculated t for the achievement test given is -0.293 (in absolute value) is less than 1.96 which was the t critical value for 2 tailed test at Df222. Here the comparison made by the three semester mathematics

score shows that there is a significant difference in rural and urban female students. But the achievement test score prepared for this study shows that the difference is not significant. To conclude and generalize whether the difference is significant or not it needs further investigation.

Table4.6 T-test comparison on math achievement of urban and rural male students

Variable	Group	N	Mean	SD	t	Df	Sig.(2tailed)	Decision
Average	rural	182	64.67	14.54	.491	225	.624	Not significant
	urban	45	63.44	16.73				
Achievement test	rural	177	45.40	19.36	.907	219	.366	Not significant
	urban	44	42.50	17.43				

Significant at $\alpha = 0.05$

In Table 4.6, for the three semesters' average mathematics scores the calculated t value .491 is less than 1.96 which was the t critical value for two tailed test at Df225. Similarly the calculated t for the achievement test given is -0.907 is less than 1.96 which was the t critical value for two tailed test at Df219. It could, therefore be concluded that the difference between rural and urban male students mathematics achievement is not significant at the second cycle primary schools of South West Shoa Zone.

4.2. Analysis of the Socio Economic factors

Table4.7 Descriptive comparison of student's math achievement and their father's education level.

Variable	Education level	N	Mean	SD	Std. Error
Average	12thComp.	2	60.38	2.65	1.86
	Elem.	97	62.10	14.39	1.46
	Illitrate	124	62.99	13.16	1.18
	Junior	95	62.04	13.42	1.38
	Sec.	26	59.95	11.91	2.34
	Diploma	15	57.45	13.76	3.55
	12thComp.+ some training	19	60.09	12.08	2.77
	Degree and above				
	Total	378	61.93	13.39	.69
Achievement test	12thComp.	2	55.00	14.14	10.00
	Elem.	97	42.02	17.74	1.80
	Illitrate	122	43.09	18.11	1.64
	Junior	94	40.01	18.18	1.88
	Sec.	26	38.46	17.91	3.51
	Diploma	15	40.80	13.33	3.44
	12thComp.+ some training	19	40.32	15.87	3.64
	Degree and above				
	Total	375	41.55	17.69	.91

Table4.8 One way ANOVA for father's education level difference in math achievement of students

Variable	Source	Sum of squares	Df	Mean square	F	Sig.	Decision
Average	Between groups	615.506	6	102.58	.568	.755	Not significant
	Within groups	66952.561	371	180.47			
	Total	67568.067	377				
Achievement test	Between groups	1180.813	6	196.80	.625	.710	Not significant
	Within groups	115885.92	368	314.91			
	Total	117066.74	374				

Significant at $\alpha = 0.05$

As shown in tables4.8, the calculated F value 0.568 is less than the critical value of 2.12 at α = .05 for the three semesters average mathematics score. Similarly, the

calculated F value 0.625 is less than the critical value 2.12 at α = .05 for the achievement test. Therefore, the analysis showed that no significant achievement difference was observed between the groups of students whose fathers are at different education levels.

Table4.9 Descriptive comparison of student's math achievement and their mother's education level.

Variable	Education level	N	Mean	SD	Std. Error
Average	Elem.	106	58.61	12.51	1.21
	Illiterate	199	47.58	13.41	0.95
	Junior	63	62.05	13.04	1.64
	Sec.	12	66.42	14.22	4.10
	Diploma	3	64.45	3.88	2.24
	12^{th}Comp.+ some training	5	60.95	14.32	6.40
	12Complete				
	Degree and above				
	Total	388	62.35	13.34	0.68
Achievement test	12^{th}Comp.				
	Elem.	104	32.00	16.88	1.66
	Illiterate	198	26.20	18.18	1.29
	Junior	60	42.3	17.50	2.26
	Sec.	12	39.67	18.62	5.37
	Diploma	3	37.87	8.00	4.62
	12^{th}Comp.+ some training	5	43.74	7.89	3.53
	Degree and above				
	Total	382	41.47	17.80	0.91

Table4.10 One way ANOVA for mother's education level difference in math achievement of students

Variable	Source	Sum of squares	Df	Mean square	F	Sig.	Decision
Average	Between groups	3234.463	5	646.893	3.764	.002	Significant at α = 0.01
	Within groups	65655.992	382	171.874			
	Total	68890.455	387				
Achievement test	Between groups	3889.012	5	777.802	2.505	.030	Significant at α = 0.05
	Within groups	116762.05	376	310.537			
	Total	120651.06	381				

It can be seen from Table 4.10, that the calculated F value 3.764 is greater than the critical value of 2.23 at α = .05 for the three semesters average mathematics score. Similarly, the calculated F value 2.505 is greater than the critical value 2.23 at α = .05 for the achievement test. Therefore, the analysis showed that significant achievement difference was observed between the students whose mothers are at different education level.

Table4.11 Descriptive comparison of student's math achievement and their Families' income

Variable	Income	N	mean	SD	Std. Error
Average	Very low	189	62.6138	13.4900	.9813
	Low	46	65.0109	12.7775	1.8839
	Middle	102	61.7377	14.3714	1.4230
	High	35	58.6714	14.3963	2.4334
	Very high	11	62.0909	17.3033	5.2171
	total	383	62.2931	13.8532	.7079
Achievement test	Very low	183	39.56	17.97	1.33
	Low	46	43.57	14.68	2.16
	Middle	102	42.35	18.5	1.83
	High	35	44.09	20.75	3.51
	Very high	11	37.27	21.71	6.55
	Total	377	41.16	18.14	.93

Table 4.12 One way ANOVA for families' income difference in math achievement of students

Variable	Source	Sum of squares	Df	Mean square	F	Sig.	Decision
Average	Between Groups	850.188	4	212.547	1.109	.352	Not significant
	Within Groups	72460.101	378	191.693			
	Total	73310.289	382				
Achievement test	Between Groups	1347.096	4	336.774	1.024	.395	Not significant
	Within Groups	122394.67	372	329.018			
	Total	123741.77	376				

Significant at α = 0.05

As shown in tables 4.11 and 4.12, the calculated F value 1.109 is less than the critical value of 2.39 at α = .05 for the three semesters average mathematics score. Similarly, the calculated F value 1.024 is less than the critical value 2.39 at α = .05for the achievement test. Therefore, the analysis showed that no significant achievement difference was observed between the different families' income groups.

Table4.13 One way ANOVA for families' income difference in math achievement of Female students

Variables	Sources	Sum of squares	df	Mean square	F	Sig.	Decision
Average	Between Groups	353.612	4	88.403	0.681	.606	Not significant
	With in groups	23494.489	181	129.804			
	Total	23848.101	185				
Achievement test	Between Groups	3979.881	4	994.970	4.030	.004	Significant
	With in groups	43942.382	178	246.867			
	Total	47922.262	182				

In table 4.13, it was observed that the calculated F value .681 is less than the critical value of 2.26 at α = .05 for the three semesters average mathematics score. But, the calculated F value 4.030 is greater than the critical value 2.26 at α = .05 for the achievement test. Therefore, the analysis showed that no significant achievement difference was observed for the three semesters Average mathematics score and showed significant differences for the achievement tests prepared for this study.

Therefore, it needs further investigation to conclude the impact of families' income on female students' mathematics achievement.

Table4.14 One way ANOVA for families' income difference in math achievement of male students

Variables	Sources	Sum of squares	df	Mean square	F	Sig.	Decision
Average	Between Groups	813.672	4	203.418	.881	.476	Not significant
	With in groups	44087.548	191	230.825			
	Total	44901.220	195				
Achievement test	Between Groups	300.015	4	75.004	.202	.937	Not significant
	With in groups	69933.332	188	371.986			
	Total	70233.347	192				

Significant at $\alpha = 0.05$

As shown in tables4.14, the calculated F value .881 is less than the critical value of 2.26 at α = .05 for the three semesters average mathematics score. Similarly, the calculated F value .202 is less than the critical value 2.26 at α = .05 for the achievement test used for this study. Therefore, no significant difference was observed in mathematics achievement of male students from families of different income levels.

Table4.15 One way ANOVA for family size and student's mathematics achievement

Variables	Sources	Sum of squares	Df	Mean square	F	Sig.	Decision
Average	Between groups	1395.040	4	348.760	1.872	.114	Not significant
	Within groups	77681.332	417	186.286			
	Total	79076.373	421				
Achievement test	Between groups	1917.756	4	479.439	1.517	.196	Not significant
	Within groups	129906	411	316.075			
	Total	131824	415				

Significant at $\alpha = 0.05$

It was shown in table 4.15 that, the calculated F value 1.872 is less than the critical value of 2.39 at α = .05 for the three semesters average mathematics score. Similarly, the calculated F value 1.517 is less than the critical value 2.39 at α = .05 for the achievement test. Therefore, the analysis showed that no significant achievement difference was observed between the students came from different family size groups.

Table4.16 One way ANOVA for Father's occupation and student's mathematics achievement

Variable	Sources	Sum of squares	Df	Mean square	F	Sig.	Decision
Average	Between groups	903.244	3	301.081	1.581	0.193	Not significant
	Within groups	84162.940	442	190.414			
	Total	85066.184	445				
Achievement test	Between groups	305.695	3	101.898	0.314	0.815	Not significant
	Within groups	140113.51	432	324.337			
	Total	140419.20	435				

Significant at $\alpha = 0.05$

As shown in table 4.16, the calculated F value 1.581 is less than the critical value of 2.62 at α = .05 for the three semesters average mathematics score.

Similarly, the calculated F value 0.314 is less than the critical value 2.62 at α = .05 for the achievement test. Therefore, the analysis showed that no significant achievement difference was observed between the students who came from fathers with different occupation.

Table4.17 One way ANOVA for mother's occupation and student's mathematics achievement

Variable	Sources	Sum of squares	Df	Mean square	F	Sig.	Decision
Average	Between groups	803.214	4	200.803	1.043	0.385	Not significant
	Within groups	85879.885	446	192.556			
	Total	86683.099	450				
Achievement test	Between groups	1034.541	4	258.635	0.802	0.524	Not significant
	Within groups	140637.16	436	322.562			
	Total	141671.71	440				

Significant at α = 0.05

Table4.17 showed that the calculated F value 1.043 is less than the critical value of 2.39 at α = .05 for the three semesters average mathematics score. Similarly, the calculated F value 0.802 is less than the critical value 2.39 at α = .05 for the achievement test. Therefore, the analysis showed that no significant achievement difference was observed between the students came from mothers with different occupation.

4.3. Analysis of Teachers' Expectation in Mathematics Achievement in Relation to Gender

Table4.18 Teachers' expectation of mathematics achievement with regard to gender

No	Close-ended question raised	Number of teachers responded	
1	Do boys and girls equally perform in math?	Yes	1 (6.7%)
		No	14 (93.3%)
2	Who perform better?	Boys	15 (100%)
		Girls	0 (0%)
3	Do boys and Girls equally participate in mathematics class?	Yes	3 (20%)
		No	12 (80%)
4	Who participates more?	Boys	12 (80%)
		Girls	
5	From which group do you expect a good mathematics achievement?	From boys	10 (66.7%)
		From girls	0 (0%)
		From both	5 (33.3%)

Questions that are the combination of close-end and open-ended were presented to all mathematics teachers of the sampled schools. Their responses were analyzed quantitatively as shown in the table above.

As it can be observed from Table 4.18 above, among the 15 teachers responded to question1, 14 (93.3%) of them responded that boys perform better than girls in mathematics.

For Question3 indicated in the table4.18, 80% of the teachers responded that there is no equal participation and said that male students participate more.

For Question 5 in table 4.18, 10(67%) of the teachers responded as they expect a good mathematics result from boys only while 33% of them expect a good mathematics achievement from both boys and girls.

4.4 Mathematics self-esteem and achievement

Table4.19 T-test comparison on mathematics self-esteem of male and female students

	Group	N	Mean	SD	t	Df	Sig.	Decision
Positive self-esteem	female	122	3.06	.50	-2.516	255	.012	significant
	male	135	3.21	.47				
Negative self-esteem	female	122	2.20	.47	1.84	255	.066	Not significant
	male	135	2.09	.52				

Significant at $\alpha = 0.05$

From table 4.19 we can see that for the positive mathematics self-esteem the calculated t value -2.516 in absolute value is greater than the critical value 1.96 for two tailed test at df 255. But, for the negative mathematics self-esteem the calculated t value 1.84 is less than the critical value for 1.96 two tailed test at df 255. Therefore, it could be concluded that there a significant difference in male and female students mathematics positive self esteem. It could also be concluded that the difference in mathematics negative self-esteem is not significant.

Table 4.20 Pearson correlation of mathematics self-esteem and its achievement

Variables		Average	Achievement test
Positive self-esteem	Pearson correlation	.179	.232
	Sig. (2-tailed)	.004	.000
	N	259	254
	t-value	2.92	3.79
Negative self esteem	Pearson correlation	-0.234	-0.207
	Sig. (2-tailed)	.000	.001
	N	259	254
	t-value	-3.86	-3.36

Significant at $\alpha = 0.05$

As it can be seen from table4.20, there is a positive correlation between students' mathematics positive self-esteem and mathematics achievement. There is also negative correlation between their mathematics negative self-esteem and its achievement. The correlation coefficient of variables positive self- esteem and Average score (0.179) with N=259 was found to be significant, because the calculated t-value 2.92 is greater than the critical value 1.96 at α = .05. Similarly the correlation coefficient of variables positive self esteem and Achievement Test Score (0.232) with N=254 was found to be significant because, the calculated t-value 3.79 is greater than the critical value 1.96 at α = .05. This means there is a significant positive relationship between students' mathematics achievement and their positive mathematics self-esteem. The correlation coefficient -0.234 and -0.207 were also observed to be significant since the calculated t-value -3.86 and -3.36 in absolute value are greater than the critical t value at df 259 & 254 and α = .05. This shows that there is a significant negative relationship between students' negative mathematics self-esteem and their mathematics achievement.

Table4.21 Pearson correlations of female students' mathematics self-esteem and mathematics achievement.

Variables		Average	Achievement test
Positive self-esteem	Pearson correlation	.104	.163
	Sig. (2-tailed)	.253	.074
	N	122	121
	t-value	1.15	1.80
Negative self esteem	Pearson correlation	-0.151	-0.163
	Sig. (2-tailed)	.097	.075
	N	122	121
	t-value	-1.67	-1.80

Significant at α = 0.05

From table4.21, it could be seen that there is a positive correlation between female students' positive mathematics self-esteem and mathematics achievement. There is also a negative correlation between their negative mathematics self-esteem and mathematics achievement. The correlation coefficient of female students' mathematics achievement and mathematics positive self-esteem was found to be not significant because the observed t-value 1.15 at df120 and 1.83 at df119 are less than the critical value 1.98 at α = .05. Similar result was observed in the correlation of negative math self-esteem and math achievement. Therefore, it could be concluded that no significant relationship was observed in female students' mathematics achievement and their mathematics self-esteem.

Table4.22 Pearson correlations of male students' mathematics self-esteem and mathematics achievement

Variables		Average	Achievement test
Positive self-esteem	Pearson correlation	.184	.270
	Sig. (2-tailed	.033	.002
	N	135	135
	t-value	2.13	3.36
Negative self esteem	Pearson correlation	-.264	-.234
	Sig. (2-tailed	.002	.007
	N	135	132
	t-value	-3.17	-2.74

Significant at α = 0.05

Table4.22 shows that there is a positive significant correlation between male students' mathematics achievement and their mathematics self-esteem. The t-test analysis of the correlation was observed to be significant because the calculated t-value 2.13 and 3.36 at df 133 are greater than the critical value 1.96 at α = .05. Therefore, it could be concluded that there is a significant positive correlation between male students' mathematics positive self-esteem and their mathematics

achievement. It could also be concluded that there is a significant negative correlation between the male students' mathematics achievement and their negative mathematics self-esteem. Because the calculated t-value -3.17 and -2.74 at df 133 and 130 are greater than the critical value 1.96.

4.5 The analysis of Family's involvement

Table 4.23a T-test comparison on mathematics achievement of students having family help while they were doing their home work

Variable	help	N	Mean	SD	t	df	Sig.2tailed	decision
Average	Yes	130	62.48	14.00	.820	427	.413	Not significant
	No	299	61.30	14.70				
Achievement test	Yes	123	41.74	18.75	.732	415	.732	Not significant
	No	294	41.08	17.53				

Significant at $\alpha = 0.05$

Table 4.23b T-test comparison on mathematics achievement of students having family assistance and guidance

Variable	Guide	N	Mean	SD	t	df	Sig.2tailed	decision
Average	Yes	339	61.87	13.89	.856	426	.392	Not significant
	No	89	60.46	13.37				
Achievement test	Yes	329	41.79	18.23	1.02	414	.309	Not significant
	No	87	39.60	16.31				

Significant at $\alpha = 0.05$

From tables 4.23a and 4.23b, it could be observed that there is no significant achievement difference was observed between students who responded as they get family help , assistance and guide in doing their homework and in general in their learning and those who responded no.

For the question "who help you more while you are doing your home work?" Those who had such help responded that their educated elder brothers and sisters help

them by explaining what is not clear for them and giving related examples. There are also some students who responded that they get help from their fathers or mothers.

For the question "what type of guide or assistance do they give you"?" Most of them responded that they tell them the benefits or advantages of learning and the disadvantages of not learning. In addition, they responded that their families assist them by providing fuels used for light, in their study the necessary educational materials and minimizing the load of work to be done in out of school time.

For the question "in what type of home activities do you participate while you are at home (out of school time)?"

The female students responded that they are participating in cooking, fetching water and fire wood, washing clothes, preparing local drinks (caticala, Tela) to get money for buying clothes, educational materials and makeup's.

In general, when they are returning back from school to their home they participate in all the activities that is going on in their home by their mothers.

But most of the rural boys responded that they look after the cattle they help their families in the process of farming and harvesting while the urban boys responded that they participate in different types of plays and in other time on studying their lessons.

CHAPTER 5

DISCUSSION

5.1 Gender differences in mathematics achievement

This study attempted to investigate the gender differences in mathematics achievement, the impacts of family's socio economic status (family's education level, location, occupation, income, size) on the students' mathematics achievement, the gender differences in mathematics self-esteem and its relation with mathematics achievement, the teachers' expectation of male and female students in mathematics teaching learning process, and the degree of families' involvement in their children's education. Thus, the discussion is based on the research question indicated in chapter one and the results obtained in chapter four.

As it was motioned in chapter four, there is a significant gender difference in mathematics achievement. The mean scores for the three semester's mathematics average scores taken from students' school records were 64.54%for males and 58.20% for females. In achievement test prepared for this study, the general score was less and it was 44.78% for males and 38.38% for females. In both cases the t-test analysis showed that the male students mean score ($t= -5.095$ and $t= -3.866$, $\alpha<.05$) was significantly better than the female students'. Previous studies by Sileshi (1995); Anbessu and Barbera (1998); Gennet (1991); Yoseph (1997); Sewunet (1995); Atsede (1991); and Bedru (2001) showed a similar result. Gennet (1991) showed that girls' performance in mathematics and sciences in national examinations of grade six and eight was poor when compared to boys during the years 1978-1987. The report of NOE (2001) also showed a significant gender difference in grade four

mathematics achievements. Mekasha (2000) also found a similar result that female students' academic achievement was less than their male counter parts.

Different researchers attributed this difference to different factors, such as psychological, sociological, cultural, and economical factors. For example Grron (1970) in Sileshi (1995) hypothesized that it is due to hereditary factors. Fennema and Sherman (1976); Aiken (1976); Becker (1981); Burton (1986); and Walkerdin (1985) suggested that it is due to the stereotyping of mathematics as a male domain and differences in treatments of parents and teachers between boys and girls. Ecceles (1985); Fennema (1985); and Leder (1986) explained that the male advantage in mathematics and mathematics related courses is due to biological factors such as hormones, genes and brain organizations , institutional factors such as curriculum, situation, environment, and participation in mathematics and mathematics related courses. But these days the biological factor is challenged as there are females who are performing as well as males or even better. Fox et al (1979) attributed it to social reinforcement contingencies. Leder (1986) mentioned that it is due to the expectation and believes of the learner and the wider society.

There are also researchers' who identified different factors for the low achievement of female students (Almaz and Barbera, 1990; Assefa, 1991; and Gennet, 1991). They noted that the subordinate position given to females' education and competence, the tradition of the society to give less value or no value to females education, the belief that females are naturally weak and incompetent, the society's culture that expects females to get married rather than go to school, lack of study time because of the loads of works in the household chores, and the teachers expectation differences for male and female students. Hantley (1997) attributed such differences to the different

ways male and female think the world around them. For instance, girls express more anxiety about mathematics than boys (Pajaras and Miller, 1994; Bernstien et al, 1992; Meec, 1988) as cited in Eshetie (2001). Wigfield and Meec (1988) as cited in Eshetie (2001) showed that girls' negative affective reaction to mathematics was stronger than boys. They concluded that it is not the poor preparation or lack of skills in part of girls that make them low achievers in mathematics but their inaccurate perception of the usefulness of mathematics.

In this study different factors were supposed to contribute to these differences and were analyzed in this study. Among these location of the students in urban or rural area is the one. As the general observation made for all students in the subject, the location in urban or rural did not show a significant difference. Similarly no significant difference was observed between urban male students and urban female students. Even though it is not significant the differences observed in the mean scores were in favor of male students with males' mean scores 63.4% in the three semesters' average mathematics score and 42.5% in the achievement test prepared for this study, while it was 61.8% and 39% for females.

The comparison was also made between urban and rural male student and also between urban and rural female students. The t-test analysis of the comparison showed that the difference between urban and rural males was not significant. Although, it is not significant the mean difference observed favored rural males. The difference between urban and rural females showed different results in the two comparison variables. In the three semesters' mathematics average score the difference was significant, while it was not significant in the achievement test given

for the purpose of the study. In both cases the difference favored urban females. On the comparison of rural females and rural males a significant difference was observed in mathematics achievement in favor of males. This shows that location is one of the factors for gender differences in mathematics achievement. This may be due to the fact that female students are loaded by house hold chores such as washing clothes of all the families, cooking food, rearing younger siblings etc and devote most of their time on such activities while rural male students have a better opportunity to devote their time on educational activities.

There may be also other factors such as less value given to female education, the sex-role domain reflected in the rural families and society, lack of educated females as a role-model in the rural areas, and the culture that initiates getting marriage rather than education for females.

A similar study by Sewunet (1995) showed that rural students' mathematics achievement was significantly better than their urban counterparts. Literatures reviewed that rural students are deprived certain educative elements and less familiar with professional and technical occupations than urban students. They are also less exposed to modern technological products like educational television, video, films etc and have fewer facilities of reference materials to develop the concepts they learnt in the classrooms. For instance Barcinas (1991); Cobb,McIntire, & Pratt (1989); Edington (1970); Ohledrof & Rafferty (1982) stated that the educational aspiration of rural youth lag behind their non rural counterparts. Haller and Virker (1993) as mentioned in literature review of this study noted that the socio economic status has a modest relationship with a child's educational aspiration, and rural families are on

average in lower status than urban. Despite this, Sewnet's (1995) and the result of this study showed that rural students are better achievers or there is no significant difference between them. This could be due to the similarity of the living condition between the observed rural and urban students included in these studies. The researcher of this study shares Sewunet's (1995) reasons suggested for the better achievement of the rural students. The reasons may be that the rural students are more prone and dedicated to their education which amounted to survival of the fittest or they put much effort to their educational performance viewing success in education help for making latter life better or due to the unwise use of time in urban students for watching TV, Video, and other recreation or may be their less commitment to their education.

The other factor considered in this study was the parents' (father's, mothers) education level. The ANOVA of father's education level did not show a significant impact on the mathematics achievement of students in this study. But the mother's education level showed a significant impact on their children's mathematics achievement. This is confirmed with the common saying that "educating female is educating the whole family." In Ethiopian culture children have more relationship with their mothers than their fathers and could easily discuss their educational problems with their mothers. It is also consistent with Ramberger's (1983) view that the higher the mother's education level the more likely girls achieve at school. Parental education is the most important predictor of participation in mathematics and science (Berryman, 1983; Malcom etal., 1985). The educated parents serve as a role model and mentors in encouraging their children to have high educational aspirations

(Oakes, 1990a). Thus it is no surprise if mother's education level influences their children's achievement.

The impact of family's income on students' mathematics performance was also observed and analyzed in this study. The ANOVA of family's income did not show significant differences on the mathematics achievement of students when it was observed on over all students under representation. With regard to income 60.57% of the subjects were from very low or low, 26.63% were from middle and 12% were from High or very high income families. The three semesters average means score were 63.81% for low or very low income families, 61.74% for middles and 62.19% for high or very high income families. Similarly the mean score of the achievement test were 41.57% for low or very low income families, 42.35% for middles and 39.22% for high or very high income families.

But literatures revealed that income has a clear impact on students' performance and pointed out that children of low income do not perform as well as children of high or middle income families (McCormic and Pressley, 1997). Pupils with lower family's income are underrepresented in the pool of mathematics majors and in professions that require mathematics competency (Maple and Stage 1991) as cited in (McCormic and Pressley, 1997). Chinapah (1983) as cited in Derese et al (1990) mentioned that the family's monthly income has a strong correlation with children's learning. Similarly Ekstrom et al (1988) and Madigan (1997) also pointed out that a difference in family's income is related to differences in mathematics and science achievements. It determines the amount of resources that the families devote on their children's school related needs.

According to the case studies of education made in U.S.A, Germany and Japan, children of low income family do not attend kindergarten and they would not enter school with an appropriate readiness to learn. In almost all woredas of South West Shoa Zone the students are entering school with out attending kindergarten in all levels of the family's income. May be this can be the cause to observe no significant differences in the mathematics achievement of students from different family's income level.

The other reason may be middle and low income families are almost in a similar living condition in the present situation of South West Shoa Zone, even though, the farmers are grouped into the stages poor farmer (low-income), middle, rich (high-income) farmer to collect taxes.

The family size was also considered in this study and as it was seen from table 1.11 in chapter four no significant differences were seen between the groups 1, 2, 3, 4, 5& above sibling families. Grouping the families into small (less than or equal to 4) and large (greater than or equal to 5) sibling sizes72.75% are large and 27.25% are small size sibling groups. No significant achievement difference was observed between the two groups. This might be because of that large proportion fall into a similar group. The mean scores for the large group were 60.97% and 41.35% while it was 62.54% and 41.86% for the small sibling group in the two comparison variables. A similar result was found by Mayer (1997). Mayer found that higher parental income has little impact on reading and mathematics test scores.

There were others who obtained different results as mentioned in the literature. For instance Downey (1998) found that academic achievement of children dropped as the family size become large. Nuttal et al (1976) investigated the impact of family size on academic achievement and showed that boys from small families tended to have a better academic achievement than boys from large families. The researcher of this study couldn't find local findings related to the impact of family size on academic achievement and particularly on mathematics achievement. Therefore, it needs further investigation to conclude the impact of family size on the children's academic achievement in general and in mathematics in particular in the primary schools of Ethiopia.

As the ANOVA of the father' and mother's occupation mentioned in chapter four showed the family's occupation has no significant impact on the students mathematics achievement. As shown in the table 5.24, 80.3% of the fathers are farmers, 3.6% are traders 9 % is employees and 6.3% are from different occupations like carpenters, local wood and metal workers etc. Because of this distribution the impact of occupation different on mathematics achievement could not be observed as expected. Similar condition was faced to observe the impact of mother's occupation on students' achievement of mathematics.

Table5.24 Parent's occupation by percent

Father's occupation	N	%	Mother's occupation	N	%
Farmer	358	80.3	Farmer	348	77.16
Trader	16	3.6	Trader	20	4.43
Employee	44	9	Employee	14	3.10
Other	28	6.3	Housewife	4	0.9
T0tal	446	100	Other	65	14.41
			T0tal	451	100

5.2 Gender differences in mathematics self-esteem and its relations with mathematics achievement

Significant difference ($t = -2.516$, $\alpha<.05$) was observed between male and female students positive mathematics self-esteem in favor of males (see table 4.19 in chapter four). The males' mathematics positive self-esteem mean score was found to be 3.21 and the females mean score was 3.06. In mathematics negative self-esteem, even though, the observed difference was failed to be significant it favored males and the mean scores were found to be 2.09 for males and 2.20 for females. That means males have less negative self-esteem than females. On the other hand a positive correlation was found between mathematics achievement and positive mathematics self-esteem and a negative correlation was found between mathematics achievement and negative mathematics self-esteem. When this correlation was analyzed for male and female students a significant positive relationship was observed between male students' mathematics achievement and their positive mathematics self-esteem.

A significant negative relationship was also observed between their mathematics achievement and their negative mathematics self-esteem. When it comes to female students the correlation was weak and not significant. These relationship strengths the difference observed between male and female students' mathematics achievement. There are previous studies which are supporting these findings.

According to Pope et al (1988) there is strong relationship between positive self-esteem and high grade points in the school. Marsh (1992) showed that specific measures of subject related self concepts are highly related to success in that content area. Lawrence (1981) as cited in Bahiru (1999) argued that high self-esteem closely related to higher success. Bachman and Omalley (1977) as cited in Solomon (1999) found that educational success is positively correlated to self-esteem. Efrem (1999) also found higher correlation between academic achievement and self-esteem. Moeller (1993) concluded that academic achievement is closely related to academic self concept. Similarly, Marsh, Smith and Barnes (1985) found that girls had significantly lower self-concept than boys. Eshetie (2001) revealed that boys had more confidence in their performance of mathematics and superior in mathematics achievement than girls. He also showed that boys were more confident than girls in solving mathematical problems. Debora (1995) also pointed out that girls had a low-self-esteem and depend on others. Fennema and Sherman (1987) pointed out that boys were more confident than girls in their mathematics skills. Yoseph (1997) revealed that students with high attitude scores perform significantly better than students with low attitude scores. Studies by (Bachman, 1972; Mullis, 1975; Benbow and Stanley, 1980) as cited in Burton (1982) showed that by age 13 boys are significantly superior to girls in both their mathematical performance and their

attitudes towards mathematics. Yoseph (1997) attributed the low performance of girls in mathematics to their attitudes towards mathematics. Therefore a psychological treatment is needed to raise the positive mathematics self-esteem of female students so that they would develop a positive attitude toward the subject mathematics and became competent with their male mates in the field.

5.3 Teachers' Expectation

Teachers teaching mathematics in the six sampled schools were asked to respond on the questions raised in teachers' questionnaire in appendix IV. As it was mentioned in chapter four 93% of the teachers expect a better performance from boys only. They have been asked to give their reason for their response and they gave the following reasons.

- Most of the time girls do not work their assignments and homework given to them. Because, they don't have enough time and they are loaded by household chores, while boys have a better opportunity to do their assignments and homework.
- They afraid and do not freely express themselves in the classroom as well as in every occasion of group discussion.
- The family and the surrounding society expect them as they are incapable to succeed in learning. There is a common saying used by the family and society. That is "*Dubarri baratte eessa qaqqabdi*" meaning" whether they are educated or not, females do not reach any where or they bring nothing".

Eighty percent of the sampled teachers mentioned that boys participate more than girls in the teaching learning process of mathematics. The reasons given were as follows.

- The girls assume themselves as they are inferior or incapable in mathematics and mathematics is a boy's subject.
- The families' and society's culture limits them to actively participate in mathematics class equally or in a better way to their male mates. They fear that if they ask or answer questions in the class, the family or the society can assume them as they are manner less. Because there is a common saying used by surrounding society "Ija baaftuun dubaraa hintoltu ija laaftuu dubaraa malee". Meaning the surrounding society and the family assume that a good manner for girls is being silent in front of people and it is considered to be shame if they are talkative or orator.

Sixty seven percent of the teachers responded that they expect a good mathematics achievement from boys only while 33% of them expects from both. The teachers had been asked rational for their expectation and they have given different reasons. They mentioned that girls do not work their assignments, home works; they do not freely express themselves in classroom discussion and in other group discussion.

The reasons given by the teachers confirm with Fennema and Sherman's (1976) which pointed out that parents often think mathematics is more important and appropriate for boys than for girls. Furthermore, parents believe that mathematics is more difficult for girls than for boys (Fox et al, 1979). Kinfe (1998) also revealed that 88% 0f the students under taken in his study agreed that mathematics is a male subject and it can only be done by males. The studies of Redpath & Claire (1989);

Krupnic, 1989 as cited in Catherine (1992) are also confirm with the teachers' points. They showed that males dominated classroom discussion by speaking 3-12 times more than females. Katherine's (1992) point is also in line with the teachers' points. Katherine mentioned that females' classroom conduct is consonant with accepted sex-role behavior that compromises women's assertiveness. McCaul (1995) found a similar result in her assessment of teacher-pupil interaction in mathematics class in Addis Ababa and showed that girls do not get an equal share of the teacher's time as pupil talk was dominated by boys. She also pointed out that teacher' expectation favors boys than girls as learners of mathematics. She then said that this may be one of the reasons why girls do not perform well in mathematics in Ethiopia. Boland (1995) also mentioned that most parents and teachers do not see young girls as future mathematicians and this can have a negative influence on girls who, otherwise, have an interest on mathematics.

The expectation and believes of the learner, the teacher and the wider society for girls achievement of mathematics is lower (Leder, 1986).

The researcher of this study also assume that, if teachers expect better performance, participation and achievement from boys only they may ignore girls in the classroom and make their interaction with boys only. This may cause hopelessness on girls and make them dull in mathematics learning process. Therefore, teachers should be aware of this and take corrective measure on their expectation of boys and girls while they are teaching mathematics. The Teacher Education System Program Overhaul (TESO), MOE (2003) stated remedial points in its contents of Competencies for Ethiopian Teachers and put that teachers must be able to value and promotes equality of opportunity, fairness and non discriminatory practices and responds positively and fairly to issues of gender, cultural and linguistic differences among

students. This can be taken as a good step and much has to be done in part of teacher training institutions to make this practical.

5.4 Family's Involvement

The t-test analysis of the family's help and guidance when children are doing their home works and assignments did not show a significant difference between the students getting help and guidance from their families and not. As it could be observed from tables 1.23a and 1.23b, although, it is not significant the mean difference favored those who are getting their family's help and guidance. The low significant level found in this study may be due to the amount of involvement that the children get from their family. As it was seen in the analysis of family's occupation large proportion of the families are farmers and according to the Ethiopian present condition most of the farmers are less educated or illiterate. Those groups getting help and guidance are provided such assistance from their elder brother and sisters or their less educated parents.

Literatures revealed that parent or family involvement significantly contributes in a variety of ways, to improve student's outcomes related to learning and school success. Keith and Lichtman (1994) found that parental involvement significantly influences children's academic achievement. Steinberg (1996) also agrees with the importance of family/parent involvement in home works and assignments for their children's educational success. But he stresses the physical involvement of families in all programs of the school. Nord (1998) finding indicated that father's involvement in children's education has a positive impact to enable them succeed in school. Nord

(1998)also added that students with two parent families are more likely to get chance to participate in extra curricular activities, enjoy schools, and not fail a grade if their fathers are involved in schools compared to those whose fathers are not involved.

The four dimensions study of parental involvement autonomy support, direct involvement, provision of structure, and elimination of destructions showed that as parent support for autonomy increased, the achievement of children also increased. But the direct parent involvement showed the opposite relationship. The study also showed that parents provided more support for autonomy as children aged and home work and assignments became more difficult. The study also pointed out that the parent involvement depends upon the family's economic, time, and skill resources. In the process of involvement in home work parents have to take into consideration the ability levels of the students. Additionally the study indicated that parents should be encouraged not to involve in self-study, but to reinforce autonomy so that students develop time management and study skills that enable them to become autonomous, lifelong learners (Cooper et al., 2000).

CHAPTER 6

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Summary

The objective of this study was to investigate the gender difference in mathematics achievement in the second cycle primary schools (grade 5-8) and explore some factors that contribute to this difference. Accordingly, the following specific questions were formulated.

- Is there a difference between males and females' mathematics achievement in second cycle primary schools?
- Does parents' socio economic status (education of mother's and fathers, family's income, family size) contribute to the gender difference in mathematics achievement?
- Does teachers' expectation of students in mathematics achievement differ for boys and girls?
- Does student's location (rural or urban) area make a gender difference in mathematics achievement at the second cycle primary school?
- Is there a gender difference in mathematics self esteem?
- Is there any relationship between mathematics self esteem and achievement in mathematics?

There are ten Woredas in South West Shoa Zone. Among these three Woredas were selected based on their geographical location from the main road from Addis Ababa to Jimma and being the Woreda of the Zonal center. From each of the sampled Woredas one urban and one rural primary school were selected. From each sampled

schools and each grade level (grades 5-8) 20 students (10 males & 10 females) were randomly selected.

Three instruments that is the achievement test, students' questionnaires and teacher's questionnaire were used to collect data. The three semester's mathematics scores of each sampled students were used as an additional source of information on students' mathematics achievement. The tests were prepared for each grade level based on the syllabuses and textbooks of the respective grades. The students' questionnaire that contains two parts, students and family's back ground information and students' mathematics self-esteem scale questionnaire was common for all the students in the sample. The teacher's questionnaire was used to collect information on teacher's expectation of boys and girls' mathematics achievement, performance and participation. These instruments were administered for trial on the pilot sample. Based on the information gathered from the pilot study the instruments were improved and employed for the final study.

Descriptive analysis, t-test, analysis of variance, and Pearson correlation were employed to analyze the data. Thus, the analysis disclosed that:

- There was statistically significant gender difference in mathematics achievement in favor of males.
- There was statistically significant difference in mathematics achievement of rural male and female students in favor of males.
- The difference observed in mathematics achievement of urban and rural females favored the urban.
- The mother's education level significantly influenced the students' mathematics achievement.

- A significant gender difference was observed in mathematics self-esteem in favor of male students.
- There was a significant positive correlation between mathematics achievement and students positive mathematics self-esteem.
- There was a significant negative correlation between male students' negative mathematics self- esteem and their mathematics achievement.
- The difference observed between urban male and female students mathematics achievement was not significant. But the few difference observed favored male students.
- The difference observed between urban and rural male students' mathematics achievement was not significant but the small difference observed was in favor of rural.
- The father' education level did not show a significant impact on students' mathematics achievement.
- The family's income, size, occupation, and their involvement in their children's education did not show a significant impact on the students' mathematics achievement.
- Teachers expect better participation, performance and achievement from male students.

6.2 Conclusion

From the above findings one can arrive at the following conclusions.

- Mathematics achievement and positive mathematics self-esteem are closely related. Having positive mathematics self-esteem is a necessary condition to achieve in mathematics and vice-versa.

- The low mathematics achievement and low mathematics positive self-esteem of female students at the second cycle primary schools has a great implication on the low participation of female students in mathematics, sciences, and technological fields at higher education.
- The significant differences observed in mathematics achievement between male and female students in general and between rural male and female student and between urban and rural female students has a great implication on Ethiopian education program as 85% of the Ethiopian population is in rural areas and Ethiopia is targeting quality primary education for all in the year 2015.
- The expectation of teachers that favor boys as better learner of mathematics limits girls from being active learners of mathematics and this cause the minimization of female students participating in mathematics, sciences, and technological courses.
- The low positive mathematics self-esteem observed in female students has a great impact on female students' mathematics achievement.

6.3 Recommendation

Based on the aforementioned discussions and conclusions the following recommendations are made. In order to bridge the gender gap in mathematics learning:

- Sensitization and awareness building activities to enable the society, family, teachers, and peers have to be made against the cultural beliefs which marginalize female students.

- Females who are showing special talents in mathematics should be encouraged and used as role models.
- Females should get more opportunities to observe role models in mathematics and related careers.
- The Woreda education offices should make an effort to build parents' awareness of female education so that they decrease the work load of female students at home and enable them to have more time for their studies.
- Opportunities should be given for students to observe female mathematicians role models so that their belief of mathematics as the male domain subject could be changed.
- Mathematics teachers should focus on classroom activities and encourage female students to actively participate in the classroom instruction.
- Teacher training institutions should give special attention to the gender issue and train teachers in a way that they could assist, help and guide the female students in learning.
- There should be the school guidance and counselor at the primary school levels so that the students could get the necessary guidance and counseling and develop positive mathematics self-esteem.
- Further research has to be conducted to devise strategies which alleviate the problem of mathematics education in general and female students in particular.

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Appendices

Appendix I

Item Specifications for grade 5-8 Mathematics Examination Prepared as an Instrument for the Study of Gender Differences in Mathematics Achievement in Second Cycle Primary Schools of South West Shoa Zone.

Grade 4

Major and Specific Content Areas	BEHAVIORAL OUT COMES				
	Know ledge	Compre hension	Applic ation	Analysis Synthesis Evaluation	Total
1. Whole numbers 1.1. Whole numbers up to 1,000,000 1.2.Order of whole numbers			1		**1**
2. The Four Basic Operations					**4**
2.1 Addition and subtraction of whole numbers.					
2.2 Properties of addition and subtraction			1		
2.3 Word problems and Educations				1	
2.4 Addition algorithm					
2.5 Subtraction algorithm					
2.6 Addition (Subtraction) with several addends (subtrahends)					
2.7 Multiplication of whole numbers			1		
2.8 Division of whole numbers	1				
3 Geometry					**1**
3.1 Basic axioms		1			
3.2 Translation					
4 Positive Rational Numbers					**2**
4.1. Partition of the whole; Fractions				1	
4.2.Representation of Positive rational numbers					
4.3.Addition and subtraction of fractions with like denominators and decimals			1		
TOTAL	**1**	**1**	**4**	**2**	**8**

Grade 5

Major and Specific Content Areas	BEHAVIORAL OUT COMES				
	Know ledge	Compre hension	Applic ation	Analysis Synthesis Evaluation	Total
1. Whole Number and the four main operations					**8**
1.1. The whole numbers greater than 1,000,000	1	1	1		
1.2. Compiling and using important properties of operations on whole numbers.			1	1	
1.3. Further applications of calculations with whole numbers.		1	1	1	
2. Introduction to the four fundamental operations					**7**
2.1. Addition and subtraction of fractions and decimals	2	2			
2.2. Multiplication and division of decimals		1	1		
3. Measurement and measuring units					**3**
3.1. Measurement of mass, time and length and heir units	1		1		
3.2. Measurement of volume, units of volume, calculations on rectangular primes			1	1	
4. Fundamental geometrical concepts and constructions					
4.1 Angles and measurement of angles					
4.2 Axial-symmetry (fundamental properties and constructions)			1	1	**2**
TOTAL	**4**	**5**	**7**	**4**	**20**

Grade 6

Major and Specific Content Areas	BEHAVIORAL OUT COMES				
	Know ledge	Compre hension	Applic ation	Analysis Synthesis Evaluation	Total
1. Divisibility of whole numbers					8
1.1. Theorems of divisibility and introduction to sets	1		2	2	
1.2. Common multiples (L.C.M) Common divisors (G.C.F)		2		1	
2. Positive rational numbers					**5**
2.1. Order of positive rational numbers		1		1	
2.2. Addition and subtraction of fractions and decimals			1		
2.3. Multiplication and division of fractions		1			
2.4. Multiplication and division of decimals		1			
3. Introduction to equations and Proportionality					**5**
3.1. Introduction to linear equations	1		1		
3.2. Direct proportionality and inverse proportionality of sequence of numbers	1	1			
3.3. Ratio and proportion				1	
4. Plane Geometry					**2**
4.1 Relations between angles					
4.2 Triangles					
4.3. Congruence of triangles		1			
4.4. Quadrilaterals and polygons					
4.5. Area and perimeter of polygons			1		
TOTAL	**3**	**7**	**5**	**5**	**20**

Grade 7

Major and Specific Content Areas	BEHAVIORAL OUT COMES				
	Know ledge	Compre hension	Applic ation	Analysis Synthesis Evaluation	Total
1. Ratio and Proportion					**6**
1.1. Revision on ration and proportion	1	1	1		
1.2. The concept "percent"					
1.3. Fundamental problems of calculation with percent			1		
1.4. Application in calculation with percent			1		
1.5. Graphical representation of data				1	
2. Positive rational numbers					**5**
2.1. The concept of rational numbers		1		1	
2.2. The order of rational numbers				1	
2.3. Addition and subtraction of rational numbers		1			
2.4. Multiplication and division of rational numbers		1			
3. Linear equations and inequalities					**5**
3.1. Equivalent equations			1		
3.2. Solving linear equations			1	1	
3.3. Solving linear inequalities		1	1		
4. Plane Geometry					**2**
4.1 Relations on elementary concepts pf geometry					
4.2 Definition of circle, positional relations between circle and straight line					
4.3. Basic theorems on the circle		1			
5. Measure of area and volume					**4**
5.1. Circumference and area of a circle		1	1		
5.2. Surface area of prisms and cylinders	1				
5.3. Volume of prisms and cylinders			1		
TOTAL	**2**	**7**	**8**	**5**	**22**

Grade 8

Major and Specific Content Areas	BEHAVIORAL OUT COMES				
	Know ledge	Compre hension	Applic ation	Analysis Synthesis Evaluation	Total
1. Working with Variables					**4**
1.1. Fundamentals for working with variables	1			1	
1.2. Fundamental operations with variables		1	1		
2. Relations; Linear Functions and Equations					**7**
2.1. The concept "Relation" and graphs of simple relations		1			
2.2. The concept function			1	1	
2.3. Linear functions and their graphical representation		1	1		
2.4. Zeros of linear functions, linear equations			1	1	
3. Squares and Square Roots					**2**
3.1. Square of numbers	1				
3.2. Calculation on square roots of numbers			1		
4. Revision on Elementary Concepts of Geometry					**7**
4.1 Rectangular Plan figures			1		
4.2 Right angle and perpendicularity			1	1	
4.3. Sum of angles of a triangle and of a quadrilateral		1	2		
4.4. Revision on Basic Geometric Construction				1	
5. Similarity					
5.1. Theorems on proportional line segments					
5.2. Similar figures and theorems on similarity					
6. The Pythagorean theorem					
6.1.Theorems about the right angle triangle					
6.2. Using the theorems for calculations					
7. Measurement of Area and Volume					
7.1. Surface area of a cone, pyramid and sphere					
7.2. Volume of cone pyramid and sphere					
TOTAL	**2**	**4**	**9**	**5**	**20**

Appendices

Appendix I

Item Specifications for grade 5-8 Mathematics Examination Prepared as an Instrument for the Study of Gender Differences in Mathematics Achievement in Second Cycle Primary Schools of South West Shoa Zone.

Grade 4

Major and Specific Content Areas	BEHAVIORAL OUT COMES				
	Know ledge	Compre hension	Applic ation	Analysis Synthesis Evaluation	Total
1. Whole numbers 1.1. Whole numbers up to 1,000,000 1.2.Order of whole numbers			1		**1**
2. The Four Basic Operations					**4**
2.1 Addition and subtraction of whole numbers.					
2.2 Properties of addition and subtraction			1		
2.3 Word problems and Educations				1	
2.4 Addition algorithm					
2.5 Subtraction algorithm					
2.6 Addition (Subtraction) with several addends (subtrahends)					
2.7 Multiplication of whole numbers			1		
2.8 Division of whole numbers	1				
3 Geometry					**1**
3.1 Basic axioms		1			
3.2 Translation					
4 Positive Rational Numbers					**2**
4.1. Partition of the whole; Fractions				1	
4.2.Representation of Positive rational numbers					
4.3.Addition and subtraction of fractions with like denominators and decimals			1		
TOTAL	**1**	**1**	**4**	**2**	**8**

Grade 5

Major and Specific Content Areas	BEHAVIORAL OUT COMES				
	Know ledge	Compre hension	Applic ation	Analysis Synthesis Evaluation	Total
1. Whole Number and the four main operations					**8**
1.1. The whole numbers greater than 1,000,000	1	1	1		
1.2. Compiling and using important properties of operations on whole numbers.			1	1	
1.3. Further applications of calculations with whole numbers.		1	1	1	
2. Introduction to the four fundamental operations					**7**
2.1. Addition and subtraction of fractions and decimals	2	2			
2.2. Multiplication and division of decimals		1	1		
3. Measurement and measuring units					**3**
3.1. Measurement of mass, time and length and heir units	1		1		
3.2. Measurement of volume, units of volume, calculations on rectangular primes			1	1	
4. Fundamental geometrical concepts and constructions					
4.1 Angles and measurement of angles					
4.2 Axial-symmetry (fundamental properties and constructions)			1	1	**2**
TOTAL	**4**	**5**	**7**	**4**	**20**

Grade 6

Major and Specific Content Areas	BEHAVIORAL OUT COMES				
	Know ledge	Compre hension	Applic ation	Analysis Synthesis Evaluation	Total
1. Divisibility of whole numbers					8
1.1. Theorems of divisibility and introduction to sets	1		2	2	
1.2. Common multiples (L.C.M) Common divisors (G.C.F)		2		1	
2. Positive rational numbers					**5**
2.1. Order of positive rational numbers		1		1	
2.2. Addition and subtraction of fractions and decimals			1		
2.3. Multiplication and division of fractions		1			
2.4. Multiplication and division of decimals		1			
3. Introduction to equations and Proportionality					**5**
3.1. Introduction to linear equations	1		1		
3.2. Direct proportionality and inverse proportionality of sequence of numbers	1	1			
3.3. Ratio and proportion				1	
4. Plane Geometry					**2**
4.1 Relations between angles					
4.2 Triangles					
4.3. Congruence of triangles		1			
4.4. Quadrilaterals and polygons					
4.5. Area and perimeter of polygons			1		
TOTAL	**3**	**7**	**5**	**5**	**20**

Grade 7

Major and Specific Content Areas	BEHAVIORAL OUT COMES				
	Know ledge	Compre hension	Applic ation	Analysis Synthesis Evaluation	Total
1. Ratio and Proportion					**6**
1.1. Revision on ration and proportion	1	1	1		
1.2. The concept "percent"					
1.3. Fundamental problems of calculation with percent			1		
1.4. Application in calculation with percent			1		
1.5. Graphical representation of data				1	
2. Positive rational numbers					**5**
2.1. The concept of rational numbers		1		1	
2.2. The order of rational numbers				1	
2.3. Addition and subtraction of rational numbers		1			
2.4. Multiplication and division of rational numbers		1			
3. Linear equations and inequalities					**5**
3.1. Equivalent equations			1		
3.2. Solving linear equations			1	1	
3.3. Solving linear inequalities		1	1		
4. Plane Geometry					**2**
4.1 Relations on elementary concepts pf geometry					
4.2 Definition of circle, positional relations between circle and straight line					
4.3. Basic theorems on the circle		1			
5. Measure of area and volume					**4**
5.1. Circumference and area of a circle		1	1		
5.2. Surface area of prisms and cylinders	1				
5.3. Volume of prisms and cylinders			1		
TOTAL	**2**	**7**	**8**	**5**	**22**

Grade 8

Major and Specific Content Areas	BEHAVIORAL OUT COMES				
	Know ledge	Compre hension	Applic ation	Analysis Synthesis Evaluation	Total
1. Working with Variables					**4**
1.1. Fundamentals for working with variables	1			1	
1.2. Fundamental operations with variables		1	1		
2. Relations; Linear Functions and Equations					**7**
2.1. The concept "Relation" and graphs of simple relations		1			
2.2. The concept function			1	1	
2.3. Linear functions and their graphical representation		1	1		
2.4. Zeros of linear functions, linear equations			1	1	
3. Squares and Square Roots					**2**
3.1. Square of numbers	1				
3.2. Calculation on square roots of numbers			1		
4. Revision on Elementary Concepts of Geometry					**7**
4.1 Rectangular Plan figures			1		
4.2 Right angle and perpendicularity			1	1	
4.3. Sum of angles of a triangle and of a quadrilateral		1	2		
4.4. Revision on Basic Geometric Construction				1	
5. Similarity					
5.1. Theorems on proportional line segments					
5.2. Similar figures and theorems on similarity					
6. The Pythagorean theorem					
6.1.Theorems about the right angle triangle					
6.2. Using the theorems for calculations					
7. Measurement of Area and Volume					
7.1. Surface area of a cone, pyramid and sphere					
7.2. Volume of cone pyramid and sphere					
TOTAL	**2**	**4**	**9**	**5**	**20**

Appendix II

Grade 5

Choose the letter of the correct answer and write the letter of your choice on the separate answer sheet attached to the question paper. **Time allowed 1hour**

1. When 508,604 is expressed in words it is _____.

   a) five hundred eight thousands and six hundred four.
   b) five hundred thousand and eight, and six hundred four.
   c) fifty thousand and eight thousand, and six hundred four.
   d) five hundred thousand and eighty six thousand, and four.

2. What is the correct symbol to be filled in the blank space to make the sentence true? $70 \times (4+15)$ _____ 69×20

   a) $<$ b) $>$ c) $=$ d) $\geq$

3. If $(25 + 250) \div 5 = m$, then m = _____

   a) 50 b) 55 c) 60 d) 65

4. Which one of the following whole numbers is divisible by 3?

   a) 1433 b) 11252 c) 23756 d) 31452

5. If $5^3 \times 5^2 \times 5^7$ is simplified, then it is _____

   a) 5^{42} b) 5^{12} c) 5^{13} d) 5^3

6. If $2x + 13 = 17$, then x = _____

   a) 2 b) 3 c) 4 d) 5

7. The sum of $\frac{1}{2}+\frac{3}{5}+\frac{4}{3}=$ _____

   a) $\frac{8}{10}$ b) $\frac{30}{73}$ d) $\frac{73}{30}$ d) $\frac{13}{30}$

8. The G.C.F of 18 and 54 is _____

   a) 2 b) 6 c) 8 d) 9

9. If $\frac{5}{7} = \frac{25}{x}$ then what is the number to be filled in the box?

a) 28 b) 35 d) 42 d) 49

10. Ten students took mathematics examination and scored the following results. 60, 65, 52, 73, 80, 81, 44, 63, 52, and 34. What is the average score of these students?

a) 55.5 b) 58.6 c) 60.4 d) 62.6

11. The sum of 0.15 + 3.4 + 7.83 – 9.21 = _____

a) 3.17 b) 2.37 c) 2.17 d) 4.34

12. Which one of the following arrangement represents the ascending order of the numbers 0.31, 0.27, 0.04, 0.009?

a) 0.27, 0.31, 0.04, 0.009 b) 0.009, 0.04, 0.27, 0.31

c) 0.04, 0.31, 0.009, 0.27, 0.31 d) 0.04, 0.27, 0.31, 0.009

13. 3 x (0.7 – 0.21) = _____

a) 0.147 b) 1.47 c) 14.7 d) 147

14. Which one of the following statement is not true?

a) 15% = 0.15 b) $\frac{3}{4} = 0.75$ c) 2.5% = $\frac{25}{100}$ d) $\frac{25}{100} = \frac{1}{4}$

15. Hours = _____ minutes

a) 3300 b) 330 c) 1980 d) 19800

16. The numbers of population in four villages are 5653, 4275, 6789 and 5291. What is the total population of the villages?

a) 22,000 b) 20,500 c) 22,800 d) 22,008

17. If 263 is divided by four, then what is the remainder?

a) 4 b) 3 c) 5 d) 7

18. If a kilogram of orange costs 2.50 Birr, then how many kg of oranges can be bought with 2500 Birr?

a) 250 b) 2500 c) 1000 d) 1500

19. A triangle whose its two sides are congruent is called _____.

a) equilateral b) isosceles c) scalene

20. If 3/7, 5/7, 9/7, 11/7, and 8/7 are arranged in their ascending order, then their arrangement will be _____

a) 3/7, 5/7, 8/7, 9/7, 11/7 b) 3/7, 5/7, 9/7, 11/7, 8/7

c) 7/7, 8/7, 9/7, 3/7, 11/7 d) 11/7, 9/7, 8/7, 5/7,3/7

Grade 6

Choose the letter of the correct answer and write the letter of your choice on the separate answer sheet attached to the question paper. **Time allowed 1hour**

1. What is the value of x and y if:

   495 a) x = 2 and y = 6 b) x = 4 and y = 5

   + x7y ? c) x = 5 and y = 5 d) x = 3 and y = 6

   871

2. Which one of the following whole numbers is divisible by 6?

   a) 37842 b) 27951 c) 38462 d) 9322

3. If $\frac{3}{7}$ +K = $\frac{7}{3}$, then K = _____

   a) $\frac{4}{21}$ b) $\frac{25}{21}$ c) $\frac{40}{21}$ d) $\frac{43}{21}$

4. (8.5 + 0.38) x 0.11 = _____

   a) 0.888 b) 0.9768 c) 8.88 d) 9.768

5. If $h \times 3\frac{3}{8} = 2\frac{1}{2}$, then h = _____

   a) $\frac{20}{27}$ b) $\frac{16}{27}$ c) $\frac{16}{27}$ d) $\frac{25}{27}$

6. What is the area of the rectangle whose length is 15cm and width is 55mm?

   a) 0.825cm b) 8.25cm c) 82.5cm d) 825cm

7. Which one of the following symbols is filled in the blank space and makes the given sentence true?

   3 × (½ + 3/4) _____ 0.5×(3/5 – 1/3)

   a) > b) < c) = d) ≤

8. A rectangular prism has length 3cm, width 2.5cm and height 4cm, what is the total surface area of the prism?

   a) 30 cm^2 b) 29.5 cm^2 c) 30.5 cm^2 d) 35cm^2

9. The truth set of $\frac{3}{4}x+\frac{7}{4}\leq\frac{5}{4}$ is _____.

a) {x: x ≤ 2/3} b) {x: x ≥ 2/3} c) {x: x ≤ -2/3}
d)) {x: x > - 2/3}

10. What is the circumference of a circle whose radius is 10cm

a) 10Π cm a) 20Π cm c) 10Π cm d) 25 Π cm

11. Chaltu took an examination in five different subjects and obtained the scores 64, 72, 87, 53 and 74. What is her average score?

a) 60 b) 70 c) 75 d) 80

12. The G.C. M. of 98 and 64 is _____

a) 8 b) 16 c) 24 d) 32

13. Let A= {1, 2, 3, 4, 5, 7}
B= {1, 2, 3, 4, 6, 7}
C= {1, 3, 5, 7}
Which one of the following is true about the sets A, B, and C?

a) A ⊆ B b) B ⊆ A c) C ⊆ A d) C ⊆ B

14 Which one of the following sets represents the set of prime numbers between 25 and 50?

a) {27, 29, 31, 37, 41, 43, 47} b) {29, 31, 37, 41, 43, 47}
c) {29, 31, 37, 39, 41, 43, 47} d) {7, 29, 31, 33, 37, 41, 43, 47}

15. If 3.71 is changed into fraction, then it is _____

a) $\frac{371}{10}$ b) $\frac{371}{100}$ c) $\frac{371}{1000}$ d) $\frac{371}{10,000}$

16. $(\frac{5}{8}\div\frac{1}{2})\times\frac{4}{5}$ = _____

a) 2 b) 5/4 c) 1 d) 5/2

17. What is the solution set of $\frac{4x+5}{7} = 2$ in the domain of rational number?

a) {2/3} b) {7/9} c) {9/7} d) {5/7}

18. If a quintal of Teff costs 250 Birr, then four quintals of Teff costs _____ Birr

a) 500 b) 1000 c) 1050 d) 1125

19. What is the truth set of $3x + 5 \leq 15$ if the domain of x is whole number?

a) {0, 1, 2} b) {0, 1, 2, 3} c) {0, 1, 2, 3, 4} d) φ

20. Find the next number in a sequence of numbers 1000, 100, 10, _____

a) 0 b) 1 c) 5 d) 10

Grade7

Choose the letter of the correct answer and write the letter of your choice on the separate answer sheet attached to the item sheet. TIME ALLOWED ONE HOUR

1. The L.C.M. of 48, 72and 128 is _____.

   a) 72 b) 144 c) 288 d) 576

2. Let A= {1, 2, 3, 4, 5}
   B= {2, 4}
   C= {1, 3}
   Which one of the following is a **true** statement?

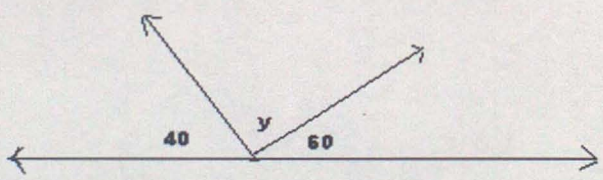
   a) B $\subseteq$ C b) C $\subset$ A
   c) B$\cap$ A = Φ d) CUC = A

3. $(\frac{3}{5} + \frac{2}{7}) \times \frac{1}{2}$ = _____

   a) $\frac{31}{70}$ b) $\frac{5}{24}$ c) $\frac{31}{35}$ d) $\frac{26}{70}$

4. If 8x + 2 = 3x + 2 + 2(x+2) then the solution set is _____
   a) {3/4} b) {5/4} c) {4/3} d) {3/2}

5. In the figure given below, what is the value of y?



   a) 100^0 b) 120^0 c) 90^0 d) 80^0

6. In a certain village there are 500 females and 400 males. What is the ratio of male to female in this village?

   a) 5:4 b) 4:5 c) 2:5 d) 5:2

7. Which one of the following could not be the measures of the sides of a triangle?

a) 3cm, 2cm, 4cm
b) 6cm, 8cms, 10cms
c) 3cm, 5cm, 8cm
b) 46cms, 6cms, 7cms

8. Which one of the following statements is not true?

a) 3/5 × (7/2 + 9/4) = (3/5×7/2) + (3/5 × 9/4)
b) 5/2 × (6/7 × 2/3) = (5/2 × 6/7) × 2/3
c) 3/7 + 9/2 = 9/2 + 3/7
d) (3/5 + 6/7) ÷ ½ = 3/5 + (6/7 ÷ ½)

9. If 40% Y = 56, then Y= _____.

a) 56 b) 96 c) 140 d) 120

10. If $\frac{a-5}{a}=\frac{4}{5}$, then a = _____

a) 25 b) 15 c) 20 d) 10

11. Ato Chala Lent 10,000 Birr at simple interest rate for a year. If he collected an amount of 10,200 Birr, What was the rate of interest?

a) 20% b) 5% c) 2% d) 10%

12. If 5000 Birr is compounded semi-annually at a rate of 6%, what will be the interest obtained at the end of a year?

a) 304.50 Birr
b) 150 Birr
c) 154.50 Birr
d) 300 Birr

13. The sum of $\frac{-5}{7}+\frac{3}{4}+\frac{2}{5}=$ _____

a) $\frac{61}{40}$ b) $\frac{30}{140}$ c) $\frac{161}{70}$ d) $\frac{61}{140}$

14. The simplest form of $\frac{-15}{18}\div(\frac{5}{7}-\frac{2}{3})$ is_____

a) $\frac{-35}{2}$ b) $\frac{-2}{35}$ c) $\frac{7}{10}$ d) $\frac{-7}{10}$

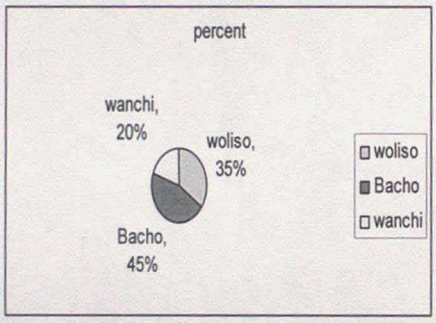
15. The solution set of $3x + 7 < 13$ for $x \in Q$ is

a) $\{x: x < 13/3 \text{ and } x \in Q\}$ b) $\{x: x < 20/3 \text{ and } x \in Q\}$
c) $\{x: x < 2 \text{ and } x \in Q\}$ d) $\{x: x < 3 \text{ and } x \in Q\}$

16. If 20kg of fertilizer is used for 50 m^2 of plote, then 650kg of fertilizer is used for _____ m^2 of plot.

a) $1525m^2$ b) $1625m^2$ c) $1650m^2$ d) $1600m^2$

17. The following circle graph shows a production of Tef in Waliso, Bacho and Wanchi Woredas. If a total 60,000 tones of Tef is produced in all the three woredas, what is the amount of Tef produced in Bacho Woreda?



a) 27000 tones
b) 30,000 tones
c) 45,000 tones
d) 37,000 tones

18. If $|2a + 5| = 15$, then the solution set of the equation is _____

a) {5,3} b) {5,-5} c) {5,10} d) {5,-10}

19. Which one of the following symbols can be filled in the blank space between the numbers? $\frac{-5}{11}$ _____ $\frac{-3}{7}$

a) < b) > c) ≥ d) =

20. The G.C.F of 64, 88 and 120 is:

a) 8 b) 4 c) 16 d) 11

21. Which one of the following measures can be the measures of angles of a triangle?

a) $60^0, 40^0, 70^0$ a) $30^0, 70^0, 80^0$
c) $90^0, 90^0, 0^0$ d) $80^0, 80^0, 40^0$

22. If $\Delta ABC \equiv \Delta DEF$ and AB = 6cm, BC = 4cm then DE= _____ cm.

a) 6 b) 4 c) 5 d) 10

23. Which one of the following sentence is <u>not true</u> about the rational numbers a, b and c?

a) $a + b = b + a$ b) $a \times (b + c) = (a \times b) + (a \times c)$

c) $(a \times b) \times c = a \times (b \times c)$ d) $a+(b \times c) = (a + b) \times (a + c)$

24. The sum of the age of the son and his father is 73 years. If the age of the son is 25 years less than his father's what is the age of the son?

a) 20 b) 24 c) 27 d) 47

25. In the number 1.4327 the place value of 3 is _____.

a) 1 b) 1/10 c) 1/100 d) 1/1000

Grade 8

Choose the letter of the correct answer and write the letter of your choice on the separate answer sheet attached to the item sheet.TIME ALLOWED ONE HOUR

1. For rational numbers a, b and c, which of the following statement is <u>not true?</u>

   a) $a + b = b + a$ b) $a \times (b+ c) = (a \times b) + (a \times c)$
   c) $(a \times b) \times c = a \times (b \times c)$ d) $a + (b \times c) = (a + b)(a + c)$

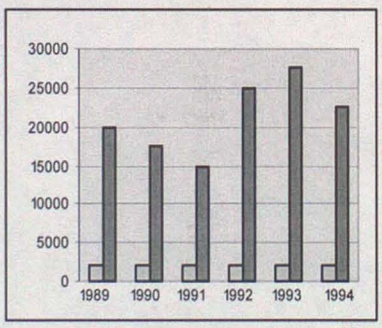
2. Ato Dirriba bought 100 quintals of Teff with 20,000 Birr. If he sold it with 10% interest, how many Birr he gained?

   a) 1000 b) 2000 c) 3000 d) 4000

3. Ato Bekele Barrowed 20,000 Birr at simple interest rate of 5% annually. What amount of Birr is required from Ato Bekele at the end of a year?

   a) 21,000 b) 20,000 c) 2,200 d) 24,000

4. The following graph shows the production and supply of onion in Waliso Woreda for the six years (1989 – 1994)



Which of the following is <u>true</u> about the graph?

a) The highest production was observed in 1990
b) The lowest production was observed in 1990.
c) The total production produced during the years 1989-1991 is less than the total production produced in the year 1992-1994.
d) The average production supplied with in the six years is 25000

5. $(5\frac{2}{3} \div \frac{4}{5}) \times \frac{4}{5} - \frac{5}{3} =$ _____

a) $\frac{33}{4}$ b) $\frac{93}{12}$ c) $\frac{47}{5}$ d) $\frac{89}{7}$

6. Which one of the following symbols has to be filled in the blank space to make the sentence true?

-2/3 + (1/6 + 3/4) _____ -3/4 x (-2/5 + 3/10)

a) < b) = c) ≤ d) >

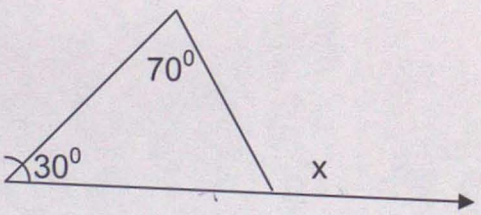
7. The truth set of $\frac{1}{2}(3x + 4) = \frac{7}{2}x - 4$ is _____.

a) {3} b) {2} c) {4} d) {5}

8. The truth set of the in equality $5x - 4 < 3x + 2$ is:-

a) {x: x > 3} b) {x: x ≥ 3}

c) {x: x < 3} d) {x: x < 4}

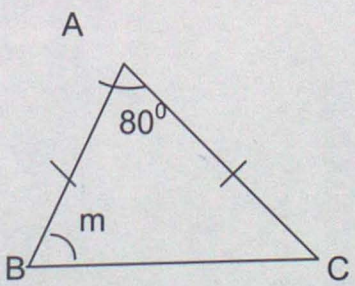
9. 

In the figure, what is the value of x?

a) 80^0 b) 70^0

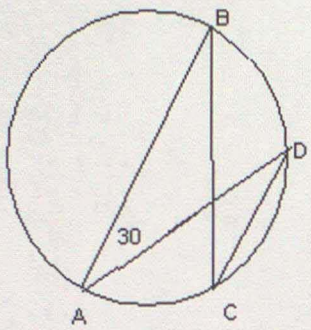
a) 100^0 d) 60^0

10. In the figure, □ABC is an isosceles .What is the value of m?



a) 80^0 b) 40^0 c) 80^0 d) 60^0

11.



In the figure, if measure of angle BAC is 30 degree then what is the measure of angle BCD ?

a) 30^0
b) 60^0
c) 45^0
d) 90^0

12. If the Circumference of a circle is 8Πcms, what is its area?

a) $2\Pi cm^2$ b) $4\Pi cm^2$ c) $8\Pi cm^2$ d) $16\Pi cm^2$

13. The product of 3x + 5 and (2x + 3) is _____

a) $6x^2 + 19x + 15$ b) $6x^2 + 13x + 15$
c) $5x^2 + 19x + 8$ d) $5x^2 + 13x + 15$

14. The simplest form of $\frac{12mn \times 70\ m^2 n}{42m^3 n}$ is

a) 20mn b) $10m^2n^2$ c) 20n d) 20

15. The radius of the base of a right circular cylinder is 10cm. If its height is 6cm long, what is its volume?

a) $200\Pi cm^3$ b) $300\Pi cm^3$ c) $500\Pi cm^3$ d) $600\Pi cm^3$

16. In sets A and B, if n(A) = 7, n(B) = 5 and n(AU B) = 10, then n(A∩ B) = _____

a) 2 b) 5 c) 7 d) 10

17. Which of the following is <u>not true</u> about sets A and B, if A ={1, 2, 3, 5, 7} and B = {2, 3, 5, 6}?

a) A/B = {1, 7} b) AΔ B = {1, 6, 7}
c) B/A = {6} d) A U B

18. The slope of a given line is 2/3 and its y-intercept is 3. What is the equation of this line?

a) $y = \frac{2}{3}x + 3$ b) $y = 3x + \frac{2}{3}$

c) $y = 3x - \frac{2}{3}$ d) $y = \frac{2}{3}x - 3$

19. What is the domain of the relation = {(-3, 2), (2, -3), (1, 8), (3, 7)}

a) {-3, 3, 2, 1} b) {2, 7, -3, 5, 8}

c) {1, 2, 3, -3, 7, 8} d) {-3, 7, 2, 1}

20. Which one of the following relations is not a function?

a) {(a, b), (a, e), (b, f)} b) {(1, 2), (2, 3), (3, 6)}

c) {(0, 1), (-1, 1), (2, -1)} d) {(a, b), (e, f), (d, e)}

21. Which one of the following statements is true?

a) $\sqrt{0.9} = 0.3$ b) $\sqrt{0.25} = 0.5$ c) $\sqrt{2.5} = 0.5$ d) $\sqrt{\frac{27}{81}} = 1/3$

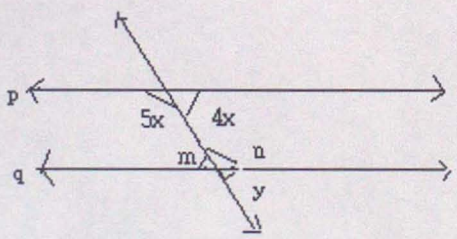
22. Which one of the following ordered pairs is on the line y = 3x + 5

a) (0 , 3) b) (1 , 5) c) (2 , 9) d) (3, 14)

23. The square of 2.5 is _____

a) 5 b) 6.25 c) 0.625 d) 0.5

24. In the figure, P //q (p is parallel to q). Which of the following statements is true about the figure?



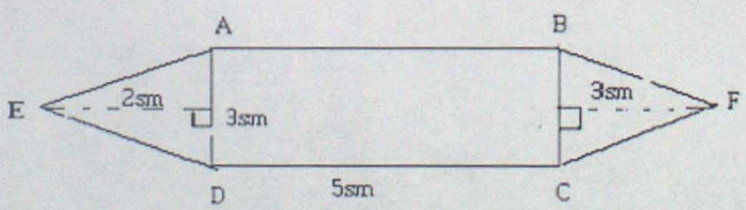
a) $x = 20^0$

b) $m = 10^0$

c) $n = 80^0$

d) $y = 120^0$

25. In the figure, ABCD is a rectangle what is the total area of the figure if DC = 5cm, AD=3cm, EG = 2cm, and EH=3cm.



a) $17.5sm^2$

b) $22.5\ sm^2$

c) $10sm^2$

d) $25.5sm^2$

ANSWER SHEET

School name _____ **Woreda** _____ **Code No** _____

1. ———	11.———	21. ———
2. ———	12.———	22. ———
3. ———	13.———	23. ———
4 ———	14.———	24.———
5. ———	15.———	25. ———
6. ———	16.———	
7. ———	17 ———	
8. ———	18.———	
9. ———	19.———	
10.———	20.———	

Appendix III

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

Part one: Student's Questionnaire

The purpose of this questionnaire is to gather information on the students' family SES and observe its impact on the student's mathematics achievement.

Put the tick (√) in the box to indicate your choice and fill the blank spaces by giving the required information

1. Sex Male ☐ Female ☐

2. Location Urban ☐ Rural ☐

3. Age _____

4. Grade level 5^{th} ☐ 6^{th} ☐ 7^{th} ☐ 8^{th} ☐

5. Father's (male guardian) level of education

Illiterate ☐ Elementary level ☐ junior sec. level ☐

Senior sec. level ☐ Grade12 complete ☐

Grade 12 complete with some training ☐

Diploma holder ☐ BSC or BA and above ☐

6.Mother's (female Guardian) level of education

**

Illiterate ☐ Elementary level ☐ junior sec. level ☐

Senior sec. level ☐ Grade 12 complete ☐

Grade 12 complete with some training ☐

Diploma holder ☐ BSC or BA and above ☐

7. Father's (male guardian) occupation

Farmer ☐ Trader ☐ Employee ☐ Other ☐

8. Mother's (female Guardian) occupation

Farmer ☐ Trader ☐ Employee ☐ Housewife ☐ Other ☐

9. If Father's (male guardian) and Mother's (female Guardian) are employees their monthly income

Father's (male guardian) _____

Mother's (female Guardian) income _____

10. If both Father (male guardian) and Mother (female Guardian) are non employees, their income status:

Very low ☐ low ☐ Middle ☐ High ☐ Very high ☐

11. Number of siblings one ☐ Two ☐ Three ☐ Four ☐
Five and above ☐

12. Do your families help you while you are doing your home work?
Yes ☐ NO ☐

13. Who help you more? Father ☐ Mother ☐
Brothers and sisters ☐

14. If yes what type(s) of help do they give you?

_____

_____

_____

15. Do your families give you guide or assistance in your learning?

Yes ☐ No ☐

16. If yes what type of guide or assistance does they given you?

_____

_____

_____

17. In what type of home activities do you participate and help your families?

_____

_____

_____

Part II: Self-Esteem Measure Questionnaire

The purpose of this questionnaire is to study the mathematics self-esteem of 2nd cycle primary school students of South West Shoa Zone. It is the chance to look at your self. It is not an exam. There is no right or wrong answers your answers and every one will have different answers. Be sure that your answers show how you feel about your self. PLEASE DO NOT TALK ABOUT YOUR ANSWER WITH ANY ONE ELSE. I will keep your answer private and NOT show them to any one. There are four possible answers for each question there are also four boxes next to each sentence and put a tick (√) in the box under the answer you chose. NOTE: SA = Strongly Disagree, DA = Disagree, A = Agree, SA = strongly agree.

	SD	DA	A	SA
1. In general, I am satisfied with my mathematics knowledge	☐	☐	☐	☐
2. At time, I think I am not good at mathematics	☐	☐	☐	☐
3. I feel that I have a good potential of doing mathematics	☐	☐	☐	☐
4. I feel I am no at mathematics to be proud of	☐	☐	☐	☐
5. I am able to do mathematics as most other people do	☐	☐	☐	☐
6. Feeling use less when it comes to mathematics.	☐	☐	☐	☐
7. All in all, I am inclined to feel, failure in mathematics	☐	☐	☐	☐
8. I wish, I could have more respect to my ability of mathematics	☐	☐	☐	☐
9. I like having to find a positive attitude to ward my capability of mathematics.	☐	☐	☐	☐

Appendix IV

Teacher's Questionnaire

The purpose of this questionnaire is to gather information on teacher's expectation of boys and girls mathematics performance. Please indicate your choice by putting a tick (√) in the box. For the open ended questions write your ideas on the blank spaces given. Use the back side of the question paper if you have more ideas.

1. Do boys and girls equally perform in mathematics? Yes ☐ No ☐
2. If your answer for No2 is "No" why? _____

_____

_____

_____

3. Who perform better? Boys ☐ Girls ☐

   Why?

_____

_____

_____

4. Do boys and girls equally participate in mathematics class?

   Yes ☐ No ☐

5. Who participates more? Boys ☐ Girls ☐

   Why? _____

_____

_____

6. From which group (Boys, Girls) do you expect a good mathematics achievement?

   From boys from girls ☐ from both ☐ from neither of them ☐

Why? _____

_____

_____

_____

Appendix: V

Kutaa 5^{ffaa}

Qubee isa deebii sirrii ta'e sirrii ta'e qabate filachuudhaan waraqaa deeviif siif kenname irratti barreessi. **Yeroon kenname sa;aatii takko qofa.**

1. Lakkoofsi 508,604, yoo Jechootaan barreeffame attam ta'a?

   a) Kuma dhibba shanii fi saddeeti fi dhibba Ja'a fi afur.
   b) Kuma dhibba shannii fi kuma saddettii fi dhibba Ja'a fi Afur.
   c) Kuma shantamaa fi kuma saddettii fi dhibba Ja'aa fi Afur.
   d) Kuma dhibba shanii fi kuma saddetamii Ja'aa fi afur.

2. Malattoon bakka duwwaa galu isa kam ta'a? $70 \times (4+15)$ ___ 69×20

   a) $<$ b) $>$ c) $=$ d) $\geq$

3. Yoo $(25 + 250) \div 5 = m$, ta'e, $m =$ _____ ta'a?

   a) 50 b) 55 c) 60 d) 65

4. Lakkoofsi sadiif Haftee malee hiramu isa kami?

   a) 1433 b) 11252 c) 23756 d) 31452

5. $5^3 \times 5^2 \times 5^7$ yoo salphine, isa kam ta'a

   a) 5^{42} b) 5^{12} c) 5^{13} d) 5^3

6. $2x + 13 = 17$, yoo ta'e bakka x kan bu'ee hima kana dhugoomsu kam ta'a?

   a) 2 b) 3 c) 4 d) 5

7. Ida'amni $\frac{1}{2} + \frac{3}{5} + \frac{4}{3}$ hagam ta'a?

   a) $\frac{8}{10}$ b) $\frac{30}{73}$ c) $\frac{73}{30}$ d) $\frac{13}{30}$

8. Hirmataan walii gudichaa (H. W. G) 18 fi 54 meeqa ta'a

   a) 3 b) 6 c) 9 d) 18

9. $\frac{5}{7} = \frac{25}{x}$ yoo ta'e bakka x kan bu'u meeqa ta'a?

   a) 28 b) 35 c) 42 d) 49

10. Ijoolleen kudhan qormmaata herregaa fudhatanii firii dhibba kessaa 60, 65, 52, 73, 80, 81, 44, 63, 52, fi 34 argatanii Jiru. Avereejiin firii isaanii dhibba keessaa meeqa ta'a?

a) 55.5 b) 58.6 c) 60.4 d) 62.6

11. decimmaalota armaan gaditti kennaman xiqaadhaa gara guddatti yoo tarreessinee isa kaam ta'a? 0.31, 0.27, 0.04, 0.009?

a) 0.27, 0.31, 0.04, 0.009 b) 0.009, 0.04, 0.27, 0.31
c) 0.04, 0.31, 0.009, 0.27, 0.31 d) 0.04, 0.27, 0.31, 0.009

12. 0.3 x (0.7 – 0.21) = _____

a) 0.147 b) 1.47 c) 14.7 d) 147

13. Himoota kennaman keessa kamtu soba?

a) 15% = 0.15 b) $\frac{3}{4}$ = 0.75 c) 2.5% = $\frac{25}{100}$ d) $\frac{25}{100} = \frac{1}{4}$

14. Sa'atii $5\frac{1}{2}$ yoo Daqiiqaa ti jijjiirre meeqa ta'a?

a) 330 b) 3300 c) 1980 d) 19800

15. Baay'inni uummata gandoota afurii 5653, 4275, 6789, 5291 Yoo ta'e walumaa galatti uumatni gandoota kanaa hagam baay'atu?

a) 22,000 b) 20,500 c) 22,800 d) 22,008

16. Gatiin buna killograma tokko qarshii 10 yoo ta'e, gatiin buna killoograma 162 meeqa ta'a

a) 16.20 b) 1620 c) 16200 d) 162

17. Lakkoofsi 263, afuriif yoo hirame hafteen isaa meeqa?

a) 3 b) 4 c) 5 d) 7

18. Gatiin burtukaana kiilograma tokkoo qarshii 2.50 yoo ta'e qarshiin 2500 burtukaana kg meeqa bituu danda'a?

a) 2500 b) 250 c) 1000 d) 1500

19. Rog-sadeen, Rognii lama wal-qixa ta'e maal jeedhama?

a) Iquulataraalii b) Aysoosilasii c) Iskalanii

20. Fraakshinoota $\frac{3}{7}, \frac{5}{7}, \frac{9}{7}, \frac{11}{7}, \frac{8}{7}$ yoo gara xiqaa gara quddaatti tartiibessame isa kam ta'a?

a) $\frac{3}{7}, \frac{5}{7}, \frac{8}{7}, \frac{9}{7}, \frac{11}{7}$ b) $\frac{3}{7}, \frac{5}{7}, \frac{9}{7}, \frac{11}{7}, \frac{8}{7}$

c) $\frac{5}{7}, \frac{8}{7}, \frac{9}{7}, \frac{9}{7}, \frac{11}{7}$ d) $\frac{11}{7}, \frac{9}{7}, \frac{8}{7}, \frac{5}{7}, \frac{3}{7}$

Kutaa 6^{ffaa}

Qubee isa deebii sirrii ta'e qabate filachuudhaan waraqaa deebiif siif kenname irratti barreessi. **Yeroon kenname sa;aatii takko qofa.**

1. Ida'ama armaan gadii keessatti gatiin x fi y meeqa?

$$\begin{array}{r} 495 \\ +\ x7y \\ \hline 871 \end{array} \quad ?$$

a) x = 2, y = 6 b) x = 4, y = 6 c) x = 3, y = 6 d) x = 5, y = 6

2. Lakkoofsa armaan gadii keessa kamtu haftee malee Ja'af hirama?

a) 37842 b) 27951 c) 38462 d) 9322

3. Yoo $\frac{3}{7}$ +L = $\frac{7}{3}$, ta'e L' meeqa ta'a?

a) $\frac{4}{21}$ b) $\frac{25}{21}$ c) $\frac{40}{21}$ d) $\frac{43}{21}$

4. (8.5 + 0.38) x 0.11 = _____

a) 0.888 b) 0.9768 c) 8.88 d) 9.768

5. Yoo h x $3\frac{3}{8}$ = $2\frac{1}{2}$, ta'e, h'n meeqa ta'a?

a) $\frac{20}{27}$ b) $\frac{16}{27}$ c) $\frac{22}{27}$ d) $\frac{25}{27}$

6. Rektaangiliin tokko dheerina 15sm fi dalgee 55mm yoo qabaate bal'inni rektaangilicha saanti-meetira meeqa ta'a?

a) 0.825 b) 8.25 c) 82.5 d) 825

7. Mallattoon bakka dawwaa galee hima armaan gadii dhugoomsu isa kami?

$0.3 \times (\frac{1}{2}+\frac{3}{4})$ _____ $0.5 \times (\frac{3}{5}-\frac{1}{3})$

a) > b) < c) = d) ≤

8. Piriiziminn Reklaangula'an tokko dheerina 3sm, dalgee 2.5sm fi olee 4sm qaba. Bali'inni fuuloota isaatii meeqa ta'a?

a) 50 sm^2 b) 59 sm^2 c) 30.5 sm^2 d) 35.5sm^2

9. Tuutii furmaataa $\frac{3}{4}x+\frac{7}{4}\leq\frac{5}{4}$ isa kami?

a) {x: x ≤ 2/3} b) {x: x ≥ 2/3} c) {x: x ≤ -2/3}
d)) {x: x > - 2/3}

10. Marsaan geengo tokko 20π sm dha. Raadiyaasiin geengichaa .....meeqa ta'a?

a) 5sm b) 20sm c) 10sm d) 15sm

11. Caaltuun gosa barnoota shan qoramtee qabxii 64, 72, 87, 53 fi 74 argatte. Avereejiin qabxii Caaltuu meeqa?

a) 60 b) 70 c) 75 d) 80

12. Hirmataan walii gudichaa (H.W.G) 96 fi 64 isa kami

a) 8 b) 16 c) 24 d) 32

13. Tuutotni A= {1, 2, 3, 4, 5, 7}
B= {1, 2, 3, 4, 6, 7}
C= {1, 3, 5, 7}
Yoo ta'an himoota kemaman keessa kamitu dhugaa dha?

a) A $\underline{C}$ B b) B $\underline{C}$ A c) C $\underline{C}$ A d) C $\underline{C}$ B

14. Lakkoofsota qophxii 25 hanga 50 ti Jiran kan qabate tuuta isa kami?

a) {27, 29, 31, 37, 41, 43, 47} b) {29, 31, 37, 41, 43, 47}
c) {29, 31, 37, 39, 41, 43, 47} d) {27, 29, 31, 33, 37, 41, 43, 47}

15. 3.71 gara Fraakshinii ti yoo jijjiirre isa kam ta'a

a) $\frac{371}{10}$ b) $\frac{371}{100}$ c) $\frac{371}{1000}$ d) $\frac{371}{10,000}$

16. $\frac{5}{8} \div \frac{1}{2} \times \frac{4}{5} =$ _____

a) $\frac{5}{16}$ b) $\frac{5}{4}$ c) $\frac{4}{5}$ d) $\frac{5}{2}$

17. Hima wal-qixa armaan gadii keessatti mandheen (Domeenin) jijiiramaa yoo akoofsa rashhinaalii ta'e, tuutni furmaata isaa maal ta'a? $\frac{4x+5}{7}$ = =]O

a) {2/3} b) {4/9} c) {9/4} d) {5/4}

18. Gatiin xaafii kuntala tokko yoo qarshii 250 ta'e gatiin xaafii qantaala Afurii fi walakaa qarshii hagam ta'a?

a) 500 b) 1000 c) 1050 d) 1125

19. Hima wal-caalma $3x + 5 \leq 15$ keessatti Domeenin /mandhen/ jijjiiramaa yoo lakkoofsa hundaa ta'e, tuutni furmaata isaa kamiin ta'a?

a) {0, 1, 2} b) φ c) {0, 1, 2, 3, 4} d) {0, 1, 2, 3}

20. akkaata tartiiba kennameetti kan bakka duwwaa bu'u isa kami?
1000, 100, 10, _____

a) 0 b) 10 c) 5 d) 1

Kutaa 7ffaa

Qubee isa deebii sirrii ta'e qabate filachuudhaan waraqaa deebiif siif kenname irratti barreessi. **Yeroon kenname sa'aatii tokko qofa.**

1. Hiramaan walii xiqqiichaa (H.W.X) 48, 72 fi 128 meeqa?

   a) 172 b) 1442 c) 2882 d)1152

2. Tuutonni A= {1, 2, 3, 4, 5}
   B= {2, 4}
   C= {1, 3}
   Yoo ta'an, jechoota kennaman kana kessa kamitu soba ta'a?
   a) B $\subseteq$ C b) C I A
   c) B$\cap$ C = φ d) CUA = A

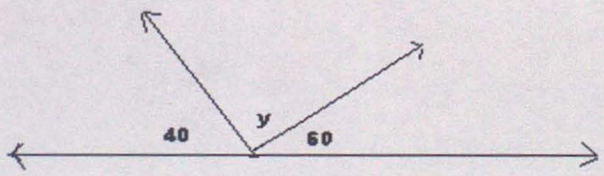
3. $(\frac{3}{5} + \frac{2}{7}) \times \frac{1}{2} =$ _____

   a) $\frac{31}{70}$ b) $\frac{5}{24}$ c) $\frac{31}{35}$ d) $\frac{26}{70}$

4. Yoo 8x + 2 = 3x + 2 + 2(x+2) ta'e gatiin x meeqa?

   a) 3/4 b) 5/4 c) 4/3 d) 3/2

5. Danaa arman gadi ti kenneme kessatti y 'n meeqa ta'a?



   a) 100^0 b) 120^0 c) 90^0 d) 80^0

6. Ganda tokko kessa dubartoota 500 fi dhiira 400 tu jira. Reeshoon baay'ina dhiiraa gara baay'ina dubartoota tii hagamii?

   a) 5:4 b) 4:5 c) 2:5 d) 5:2

7. Kanneen sa- sadan arman gaditti kennaman keessa kamtu dheerina rogoota rog-sadee ta'uu hindanda'u?
   a) 3sm, 2sm, 4sm b) 6sm, 8sm, 10sm
   c) 3sm, 5sm, 8sm d) 4sm, 6sm, 7sm

8. Himota arman gadi ti kennaman kessa kami tu soba?

a) 3/5 × (7/2 + 9/4) = (3/5×7/2) + (3/5 × 9/4)
b) 5/2 × (6/7 × 2/3) = (5/2 × 6/7) × 2/3
c) 3/7 + 9/2 = 9/2 + 3/7
d) (3/5 + 6/7) ÷ ½ = 3/5 + (6/7 ÷ ½)

9. 40% Y = 56 yoo ta'e, y meeqa ta'a?

a) 56 b) 96 c) 140 d) 120

10. $\frac{a-5}{a} = \frac{4}{5}$ yoo ta'e gatiin a meeqa?

a) 25 b) 15 c) 20 d) 10

11. Caalaan qarshii 10,000 dhala baaqee ti liqeessee waggaa tokko booda kuufama qarshii 10,200 argate. Reetiin dhala kanaa hagami?

a) 20% b) 5% c) 2% d) 10%

12. Qarshiin 5000 reeti dhala dhalaa 6%'n Ji'a Ja'ati shallagamuun yoo liqeefatame, dhuma waggaa tokkoo ti qarshi hagam dhala?

a) qarshii 304.50 Birr b) qarshii150 Birr
c) qarshii 154.50 Birr d) qarshii 300 Birr

13. Ida'amni $\frac{-5}{7} + \frac{3}{4} + \frac{2}{5} =$ _____

a) $\frac{61}{40}$ b) $\frac{30}{140}$ c) $\frac{161}{70}$ d) $\frac{61}{140}$

14. $\frac{-15}{18} \div (\frac{5}{7} - \frac{2}{3})$ yoo salphifne meeqa ta'a?

a) $\frac{-35}{2}$ b) $\frac{-2}{35}$ c) $\frac{7}{10}$ d) $\frac{-7}{10}$

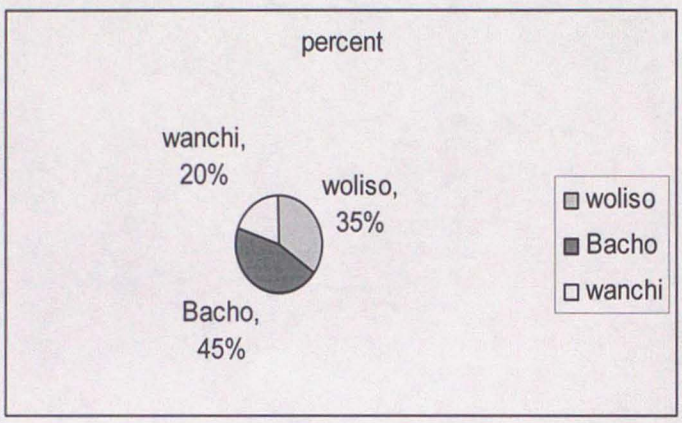
15. Tuutin furmaata 3x + 7 £ 13 isa kami?

a) {x: $x < \frac{13}{3}$ } b) {x: $x \leq \frac{20}{3}$}a
c) {x: $x \leq 2$ } d) {x: $x \leq 3$ }

16. Lafa ball'inni isaa $50m^2$ ta'e gabbisuuf xaa'oo 20kg yoo barbaachise, xaa'oon 650kg lafa bal'ina hagami gabbisuu danda'a?

a) 1600 sq.m b) 1625 sq.m
c) 1650 sq.m d) 1525 sq.m

17. Giraafii geengoon armaan gaadii baay'ina omisha xaafii kan aanna Bachoo, Walisoo fi Wancii Mul'isa. Dimshashaashumatti xaafiin aanaa sadanu keessatti omiishame xaafii tonnii 60,000 yoo ta'e omishni aanaa Bachoo toonii meeqa ta'u qaba?



a) 27000
b) 30,000
c) 45,000
d) 37,000

18. Yoo $|2a + 5| = 15$, ta'e tuutni furmataa isaa maal ta'a?

a) {5,3} b) {5,-5} c) {5,10} d) {5,-10}

19. $\frac{-5}{11}$ _____ $\frac{-3}{7}$ Mallattoon hariiroo bakka duwwatti guutamee hima kana dhugoomsu isa kami?

a) < b) > c) $\geq$ d) =

20. Hirmaataan waliin guddaa (H. W. G) 64, 88 fi 120 isa kami

a) 4 b) 8 c) 16 d) 11

21. Safara kofoota Rog-sadee tokkoo ta'u kan danda'an isaan kami?

a) $60^0, 40^0, 70^0$ a) $30^0, 70^0, 80^0$
c) $90^0, 90^0, 0^0$ d) $80^0, 80^0, 40^0$

22. Yoo $\Delta ABC \equiv \Delta DEF$ ta'e, AB = 6sm, BC = 4sm dheerinni DE hagam ta'aa?

a) 5sm b) 4 sm c) 6 sm d) 10 sm

23. a, b fi c'n yoo Lakkoofsa raashinaali ta'an, hima wal-qixaa armaan gaditti kennaman keessaa kamitu Soba?

a) $a + b = b + a$ b) $a \times (b + c) = (a \times b) + (a \times c)$

c) $(a \times b) \times c = a \times (b \times c)$ d) $a+(b \times c) = (a + b) \times (a + c)$

24. Umuriin Caala fi kan abba isaa walitti yoo ida'ame 73 ta'a. Yoo umariin Caalaa 25 kan abbaa isaatii gadi ta'e umuriin Caalaa meeqa ta'a?

a) 20 b) 24 c) 27 d) 47

25. Lakkoofsa 1.4327 keessatti gatiin bakkaa kan 3 hagami?

a) 1 b) $\frac{1}{10}$ c) $\frac{1}{100}$ d) $\frac{1}{1000}$

Kutaa 8ffaa

Qubee isa deebii sirrii ta'e qabate filachuudhaan waraqaa deebiif siif kenname irratti barreessi. **Yeroon kenname sa;aatii takko qofa_**

1. Hima wal-qixa armaan gaditti kennaman keessa yoo a, b, c ϵ Q ta'e, inni soba ta'e, isa kami?

   a) a + b = b + a b) a × (b+ c) = (a × b) + (a × c)

   c) (a × b) × c = a × (b × c) d) a+ (b + c) = (a × b) + (a × c)

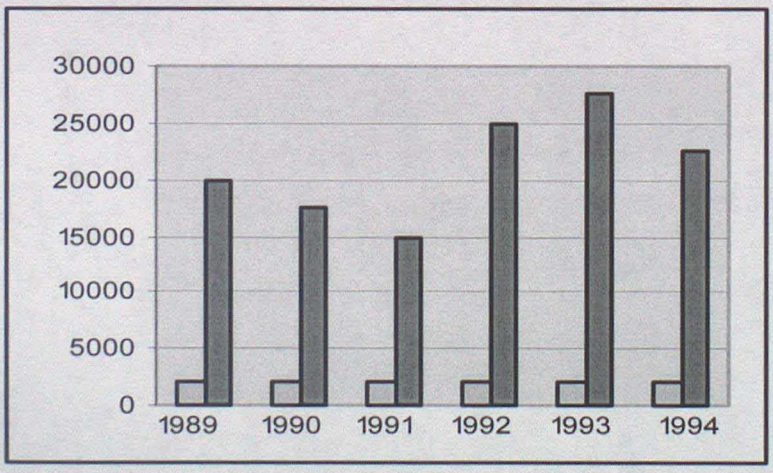
2 Dirribaan xaafii kuntaala dhibba qarshii 20,000 bitee, 10% buufachuundhaan gurgure. Dirribaan bu'aa qarshii hagami argate?

   a) 1000 b) 2000 c) 3000 d) 4000

3. Obboo Gammachuun dhala baaqqee waggaatti shallagamuun xaa'oo qarshii 20,000 reetii 5% tiin fuudhanii qotee bulaa Ganda isaaniitiif raabsan. Obboo Gammachuun Waggaa tokkotti qarshii meeqa sassaabanii deebisu qabu?

   a) 21,000 b) 20,000 c) 2,200 d) 24,000

4. Giraafiin armaan gadii omisha qullubbii (shunkurtaa) waggaa Ja'aaf aanaa Walisootti Omiishame gabaa Finnfinnee ti dhiyaate agarsiisa. Giraafii Kenname kana irratti hunda' uudhan hima sirrii ta'e filadhu?



a) Omishii qullubii (shunkartaa) kan baay'inaan omiishame dhiyaatee bara 1990 ti
b) Omishii qullubii (shunkartaa) kan baay'inaan omiishame dhiyaatee bara 1994 ti.
c) Omishii qullubii (shunkartaa) kan xiqqaan dhiyaate bara 1991 ti.
d) Omishii qullubii (shunkartaa) kan bara 1989-1991 ti omiishamee gabbaa fiffinnee ti dhiyaate kan bara 1992-1994 tii ni caala

5. $(5\frac{2}{3} \div \frac{4}{5}) \times \frac{7}{5} - \frac{5}{3} =$ _____

a) $\frac{33}{4}$ b) $\frac{93}{12}$ c) $\frac{47}{5}$ d) $\frac{89}{7}$

6. Mallattoon sirriin bakka duwwaa galee hima kana dhuugoomsu isa kami?

-2/3 + (1/6 + 3/4) _____ -3/4 × (-2/5 + 3/10)

a) < b) = c) ≤ d) >

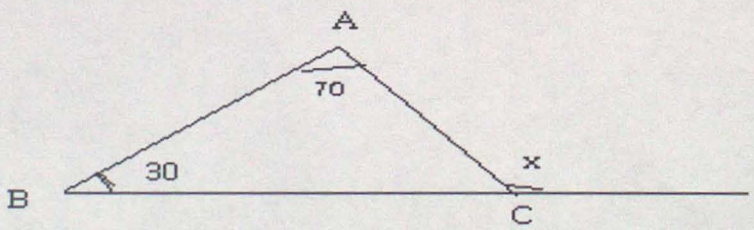
7. Tuutni furmataa $\frac{1}{2}(3x + 4) = \frac{7}{2}x - 4$ maal ta'a?

a) {3} b) {2} c) {4} d) {5}

8. Tuutni furmaata $5x - 4 < 3x + 2$

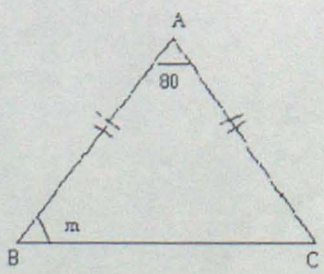
a) {x: x > 3} b) {x: x ≥ 3}
c) {x: x < 3} d) {x: x < 4}

9. danaa armaan gaditti kenname keessatti, yoo S(R A) =70° , S(R B)= 30° ta'e x'n meeqa ta.a?



a) 80° b) 70° c) 100° d)130°

10.

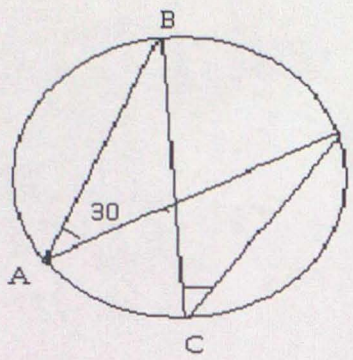


Danaa armaan gadii keessatti △ABC'n aayisoosilasii,

S(Â) = 80° yoo ta'e gatiin m meeqa ta'a?

a) 80° b) 40° c) 50° d) 60°

11.



Danna armaan gadii keessatti S(BÂD) yoo 30° ta'e S(BĈD) meeqa ta'a?

D a) 100° d) 60° c) 45° d) 30°

12. Marsaan geengoo tokko yoo 8Πsm yoo ta'e, bal'inni isa hagam ta'a?

a) Πsm^2 b) $4\Pi sm^2$ c) $8\Pi sm^2$ d) $16\Pi sm^2$

13. (3x + 5) fi (2x + 3) yoo waliin baayifnee maal argama?

a) $6x^2 + 19x + 15$ b) $6x^2 + 13x + 15$

c) $5x^2 + 19x + 8$ d) $5x^2 + 13x + 15$

14. $\frac{12mn \cdot 70m^2n}{42m^3n}$ yoo salphifnee isa kam ta'a?

a) 20mn b) $10m^2n^2$ c) 20n d) 20

15. Raadiyasiin hundee kan silinderii geengawaa sirri 10sm. Oleen isaa 6sm yoo ta'e qabeen isa hagam ta'a?

a) $200\Pi sm^3$ b) $300\Pi sm^3$ c) $500\Pi sm^3$ d) $600\Pi sm^3$

16. Tuutata A fi B keessatti n(A) = 7 , n(B) = 5, n(AU B) = 10 yoo ta'e $n(A \cap B)$ = _____

a) 2 b) 5 c) 7 d) 10

17. Tuutni A = {1, 2, 3, 5, 7} ,
B = {2, 3, 5, 6} yoo ta'e, kam tu soba?

a) A/B = {1, 7} b) $A \Delta B$ = {1, 6, 7}

c) B/A = {6} d) A U B = A

18. Sararri tokko dhundhulli isaa 2/3 , bakki inni itti siiqee – y qaxaamuru immo 3 irratti yoo ta'e himi wal – qixa isaa maal ta'a?

a) $y = \frac{2}{3}x + 3$ b) $y = 3x + \frac{2}{3}$

c) $y = 3x - \frac{2}{3}$ d) $y = \frac{2}{3}x - 3$

19. Hariiroon R= {(-3, 2), (3, 7) (2, -3), (1, 8) }, yoo ta'e, tuutni mandhee isaa kam ta'a

a) {-3, 3, 2, 1} b) {2, 7, -3, 5, 8}

c) {1, 2, 3, -3, 7, 8} d) {-3, 7, 2, 1}

20. Iskuweerin 2.5 meeqa?

a) 5 b) 6.25 c) 0.625 d) 0.5

21. Hariirowwan armaan gaadii keessatti kamtu Faankishinii miti?

a) {(a ,b) , (a, e), (b, f)} a) {(1 ,2) , (2, 3), (3, 6)}

c) {(0 ,1) , (-1, 1), (2, -1)} d) {(a ,b) , (e, f), (d, e)}

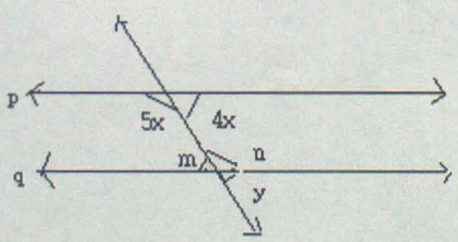
22. Isa kamtu dhuugaa dha?

a) $\sqrt{0.9} = 0.3$ b) $\sqrt{0.25} = 0.5$ c) $\sqrt{2.5} = 0.5$ d) $\sqrt{\frac{27}{81}} = 1/3$

23. Tuqalee armaan gaditti kennamaan keessaa kan giraafii $y = 3x + 5$ irratti argamu isa kami?

a) (0 , 3) b) (1 , 5) c) (2 , 9) d) (3, 14)

24. Danaa armaan gadii keessatti P//q (p'n wal-tarre q) yoo ta'e, himoota kennaman keessaa kamtu dhugaa dha



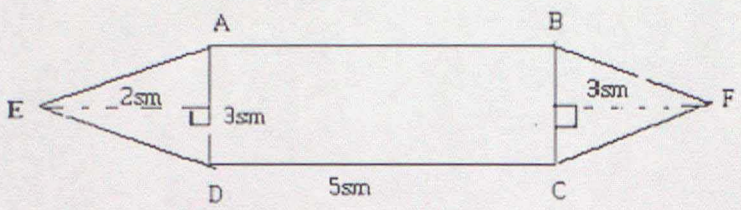
a) $x = 20^0$

b) $m = 10^0$

c) $n = 80^0$

d) $y = 120^0$

25. Danna armaan gaditti kenname keessatti ABCD'n rektaangilii yoo ta'e bal'inni danichaa hagam ta'a?



a) $17.5sm^2$
b) $22.5\ sm^2$
c) $10sm^2$
d) $25.5sm^2$

Bakka Deebii

Maqaa _____ **Aanaa** _____

Maqaa mana Barumsa _____

1. _____	11. _____	21. _____
2. _____	12. _____	22. _____
3. _____	13. _____	23. _____
4. _____	14. _____	24. _____
5. _____	15. _____	25. _____
6. _____	16. _____	
7. _____	17. _____	
8. _____	18. _____	
9. _____	19. _____	
10. _____	20. _____	

Appendix VI

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

Gaaffii Barattootaaf Qophaa'ee

Code _____

Kaayyoon gaaffilee kanaa , haalli jireenya maatii hammam barumsa ijoollee irratti dhiibbaa gochuu akka inni danda'u hubachuufi qorannoo geggeeffamu keessatti ragaa funaanuuf akka gargaaruuf kan qophaa'eedha. Gaaffii isa filannoo ta'eef saanduqa keessa mallattoo (×) kaa'udhaan ibis. Isa filannoodhaan hin laatamniif immoo yaada kee bakka duwaaa kenname irratti ibis. Yoo bakki kenname si hanqate dudda waraqaa gaaffii gargaarami.

1. Saala: Dhiira ☐ Dhalaa ☐

2. Bakka teessoo: Magaalaa☐ Baadiyaa ☐

3. Umurii: 12 fi isaa gadi ☐ 13-15 ☐ 16-18☐ 19 fi isaa ol ☐

4. Sadarkaa barumsaa 5^{ffaa} ☐ 6^{ffaa} ☐ 7^{ffaa} ☐ 8^{ffaa} ☐

5. Sadarkaa barumsa abbaa Ykn kan akka abbatti gargaaruu

   Kan tasumaa(homaa) hinbaranne ☐ sadarkaa gad-aana ☐

   Sadarkaa Giddu-galeessaa ☐ Sadarkaa ol-aanaa ☐

   12^{ffaa} kan xumure ☐

   12^{ffaa} xumuree leenjii muraasa irratti kan qabu ☐

   Dippiloomaa ☐ Digrii ykn isaa ol ☐

6. Sadarkaa barumsa Haadhaa Ykn Akka haadhaatti kan gargaaruu

   Kan homaa hinbaranne ☐ sadarkaa gad-aana ☐

   Sadarkaa Giddu-galeessaa kan xumure ☐ Sadarkaa ol-aanaa kan xumure ☐

   12^{ffaa} kan xumure ☐

   12^{ffaa} xumuree leenjii muraasa irratti kan qabu ☐

   Dippiloomaa ☐ Digrii ykn isaa ol☐

7. Hojii abbaa Ykn kan akka abbatti gargaaruu _____
8. Hojii haadhaa ykn kan akka haadhaatti gargaaruu _____

9.Yoo abbaan ykn kan akka abbatti gargaaruu fi haati ykn kan akka haadhaatti gagaartu hojjettota mindaa qaban ta'an,

Mindaa ji'aa kan abbaa ykn kan akka abbaatti gargaaruu _____

Mindaa ji'aa kan haadhaa ykn kan akka haadhaatti gargaaruu _____

10.Yoo abbaan ykn kan akka abbatti gargaaruu fi haati ykn kan akka haadhaatti gagaartu hojjettota mindaan hin qaxaramne ta'an, sadarkaan galiin isaani ji'atti tilmaaman

Baayyee Xiqqaa(qarshii 100 fi gadi) ☐ Xiqqaa (qarshii 101-250) ☐

Giddu galeessa(qarshii 251-800) ☐ Guddaa(qarshii801-1200)☐

bayyee guddaa(qarshii 1201 fi isaa ol) ☐

11. Baay'ina maatii (ijoollee) Tokko ☐ Lama ☐ Sadi☐

Afur ☐ Shaniif isaa ol ☐

12.Yeroo ati hojii manaa barsiisanke siif kenne hojjettu maatiin kee gargaarsa siif godhu?

Nigodhu ☐ hin godhan ☐

13. Eenyutu irra guddaa gargaarsa siif godha?

Abbaa ☐ Haadha ☐ obbolaa ☐ Eenyu iyyu nafi hin godhu ☐

14. Yoo siif godhu ta'e gagaarsa attamii siif godhu?

_____

_____

15. Barumsa keetti aka ati jabaattuuf maatiinke gorsa adda addaa siif laatuu?

Naaflaatu ☐ naaf hinlaatan ☐

16. Yoo siif laatu ta'e gorsa attamii?

_____

_____

17. Yeroo barumsa kee ala hojii attam attmii irratti hirmaachuudhaan maatii kee gargaarta?

_____

_____

_____

Gaaffii barattonnii ilaalcha dandeettii barumsa herregaa ofii issaanii irratti qaban akka ibsaniif qophaa'e (self-esteem questionnaire)

Qajeelcha: gaaffii armaan gadditti kennamaaniif deebiin sirri YKN sirrii miti jedhamu hinjiru. Kanaafuu filannoo shanan kennaman keessaa kan yaada mataakee ibsuu danda'u filachuudhaan saanduqa kenname keessa mallattooo(×) kaa'i.

	Baayiseen Walii gala	waliin gala	itti walii hin galu	gonkuumaa walii hin galu
1 . Waluumaa galatti, dandeettin barumssa herregaatti qabu quubsaadha jedheen amana.	☐	☐	☐	☐
2. barumsa herregaa irratti akkan homaa dandeettii hinqabnneettin of- ilaala.	☐	☐	☐	☐
3. Barumsa herregaa irratti dandeettii ga'aa akkan qabuttin of yaada	☐	☐	☐	☐
4.Barumsa herregaa irratti dadeettiin itti boonu tokko illee akkan hin qabneittin of ilaala.	☐	☐	☐	☐
5.Barumsa herregaa irratti, akkuma hiriyoottan koo baay'een hojjeetanitti hojjechuun dandada'a jedheen yaada.	☐	☐	☐	☐
6. Barumssa herregaatti wayi tkko gatii hinqabu jedheen of-fudhadha.	☐	☐	☐	☐
7.Yeroo hunda, barumsa herregaatti nankufa jedheen yaada.	☐	☐	☐	☐
8.Dandeettiin barumsa herrgaa irratti qabuuf ilaalcha gaarii kennuu nanhawwa.	☐	☐	☐	☐
9. Dandeettiin barumssa herregaa itti qabuuf ilaalcha gaariin qaba.	☐	☐	☐	☐

Appendix: VII

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

Gaaffii Barsiisotaaf Qopaa'ee

Kaayyoon gaaffilee kanaa, qorannoo firii barattonni barnoota herregaa irratti argatan ilaalchisee, garaagarummaa dhiiraa fi dhalaa gidduu jiru ilaaluf aka gargaaruufi ittiin raga funaanuuf kan qophaa'ee dha.Gaaffii isa filannoo ta'eef saanduqa keessa mallattoo (×) kaa'udhaan ibis. Isa filannoodhaan hin laatamniif immoo yaada kee bakka duwaaa kenname irratti ibisi. Yoo bakki kenname si hanqate dudda waraqaa gaaffii gargaarami.

1. Barattootni dhiiraa fi dubaraa , barumsa herregaa kessatti wal-qixa hojjetuu?
   Eeye ☐ Miti ☐

2. Miti yoo ta'e maaliifi? _____

3. Eenyutu caalmaa hojjeta? Dhiira ☐ Dubara ☐

   Maaliifi? _____

4. Dhiirotni fi dubarrii, kutaa barnoota herregaa keessatti hirmaanna wal-qixxee ta'e qabuu?

   Eeyee☐ Miti ☐

5. Yoo miti ta'e eenyutu caalmaatti hirmaannaa godha? Dhiira ☐ Dubara ☐

6. Maaliifi? _____

7. Garee kami irraa (dhiira,dubara) firii barumsa herregaa gaarii eegda?

   Dhiiroota irra☐ Dubara irraa ☐ lachuu irraa ☐
   Tokkoon isaanii irraawu ☐

   Maaliifi? _____