Chapter – I

# INTRODUCTION

## Background of the Study

The history of teaching mathematics is as old as the human civilization. The history of mathematics is a powerful tool for a disseminating an understanding of mathematics. Every culture in the earth has developed some mathematics. In some cases, this mathematics has spread from one culture to another. Now there is one predominant international mathematics, and this mathematics has a quite history. It has roots in ancient Egypt and Babylonia, and then grew rapidly in ancient Greece. Mathematics written in ancient Greek was translated into Arabic. About the same time some mathematics of India was translated into Arabic. Later some of this mathematics was translated into Latin and became the mathematics of Western Europe. Over a period of several hundred years, it became the mathematics of the world. Mathematics continues to grow at a phenomenal rate. There is no end in sight, and the application of mathematics to science becomes greater all the time.

Education as a system can be called the brain of any society and it is the backbone of any system. Mathematics is a vast adventure in ideas, an exact science and truly saying the mirror of civilization. According to Perry, mathematical education began because it was useful, it continues because of the usefulness of its results. Nowadays, even the social sciences are becoming increasingly mathematical. Most mathematical creations are the result of intuition. The direction of modem mathematics has been greatly influenced by the developments in other disciplines.

The mathematical sciences have changed significantly during the past few decades. The most obvious change is the enormous growth of mathematics. Even the latest scientific and technological developments have extended each branch of mathematics and have proved mathematics as a powerful tool for any scientific achievements.

Mathematics shows much more durability in its attention to concepts and theories than do other sciences. These days history of mathematics is a powerful tool for a disseminating an understanding of mathematics. We look at history as a way of

motivating the learner to see the significance of the area being studied. We consider history as a route to help the learner understand the path of development to a mathematical concept or process. With the history of mathematics, students will come to know that mathematical science is a work of all civilizations, and teachers will find more confidence in teaching. However, the goals of mathematics education differ according to the country's socio-economic condition and the innovation of science and technology in the society and the existing educational status of a country. Nevertheless, mathematics is taught in all levels of education in every country in the world. The history of mathematics reflects some of the noblest thoughts of countless generations.

Attitude towards mathematics plays a crucial role in the teaching and learning processes of mathematics. It affects students' achievement in mathematics. The teaching method, the support of the structure of the school, the family and students' attitude towards school affect the attitudes towards mathematics. Usually, the way that mathematics is represented in the classroom and perceived by students, even when teachers believe they are presenting it in authentic and context dependent way stands to alienate many students from mathematics (Barton, 2000; Furinghetti and Pekhonen, 2002).

Researchers concluded that positive attitude towards mathematics leads students towards success in mathematics. Attempt to improve attitude towards mathematics at lower level provides base for higher studies in mathematics. It also causes effect in achievement of mathematics at secondary school level (Ma and Xu, 2004).

Attitude is a central part of human identity. Everyday people love, hate, like, dislike, favour, oppose, agree, disagree, argue, persuade, etc. All these are evaluative responses to an object. Hence attitudes can be defined as "a summary evaluation of an object of thought" (Bohner & Wänke, 2002). Attitudes are influenced by three components. They are cognitive (beliefs, thoughts, attributes), affective (feelings, emotions) and behavioural information (past events, experiences) (G. Maio, G. R. Maio, & Haddock, 2010).

Nepalese mathematical system is highly influenced by the development of world's mathematical system. The history of mathematics teaching in Nepal started

with the starting of "Gurukula" in ancient period whereas the modern education system in Nepal seems to follow the world's educational system.

The knowledge of mathematics is an essential tool in our society (Baroody, 1987). It is a tool that can be used in our daily life to overcome the difficulties faced (Bishop, 1996). Due to this mathematics has been considered as one of the most important core subject in a school curriculum. More mathematics lessons are likely to be taught in schools and colleges throughout the world than any other subject (A. Orton, D. Orton, & Frobisher, 2004). However, the standard tests and evaluations reveal that students do not perform to the expected level. The student under achievement in mathematics is not just a concern for particular countries, but has become a global concern over the years (Pisa, 2003). Several studies and researches have been done in many countries to find the factors that influence the students' performance in mathematics. Among these factors, students' attitude towards mathematics is one important factor that has been consistently studied. Often, the studies on relationship between students' attitude and the students' academic performance show a positive relationship (Mohd, Mahmood, & Ismail, 2011; Bramlett & Herron, 2009; Nicolaidou & Philippou, 2003; Papanastasiou, 2000; Ma & Kishor, 1997). Hence students' attitude towards mathematics is a major factor that might influence the performance of the students. Due to this, several studies have been conducted in different countries in order to find out the students attitude towards mathematics and hence, to use these data to suggest the low performance of students and factors affecting it. (Tahar, Ismail, Zamani & Adnan, 2010; Tezer & Karasel, 2010; Maat & Zakaria, 2010; Bramlett & Herron, 2009; Köğce, Yıldız, Aydın, & Altındağ, 2009; Tapia & Marsh, 2004; Fennema & Sherman, 1976)

The subject mathematics is taught in the basic level of education in every country all over the world. In ancient civilization period, the written curriculum was not available but arithmetic and geometry are used in practice. In Stone Age, people make the weapons of different shape and size and using fingers of hands and legs for counting. With the change in time, they entered in agriculture age to make life standard and started to keep domestic animals with them. They used those animals for transportation, supplying food, materials and ploughing fields. They counted domestic animals with the help of one to one correspondence with the stick or small stone.

Similarly, time was calculated as morning, afternoon, evening and night. Also length was measured by hand.

An ancient Greece was recognized to be the first state for the development of ancient education system (Sharma, 2028 B.S., p. 327). The educational system was set up in two cities Sparta and Athens. A greater attention was given to education in Sparta which consisted activities like games exercise, gymnastics, running, household. But in Athens all aspects like emotional, intellectual and physical exercise were given importance. Liberal arts, liberal education, dialectic method were developed in Athens. Only mathematics was not included as a discipline in early period in Sparta and Athens. However, mathematical concepts were introduced in military academics.

Sophist school during 480 B.C. played most important role for mathematician education. Sophist school aroused as a demand of teacher. These teachers were called "Sophist" or "Wiseman". They taught geometry, astronomy, philosophy and language. The school during the seventh-century B.C. (The Ionic School, the school of Pythagoreans, the sophist school, the platonic school etc.) informally played vital role for development of early Greek mathematics education.

The trend of mathematics curriculum development process was limited up to simply addition, subtraction, multiplication and fraction. One of the earlier evidence of man's first wandering in mathematics is a bone dug up in the 1950's at Ishango in Zaire (Congo). The bone has what looks a tally mark engraved on it. There has been various interpretations of these marks. One archeologist believes that the tally marks depict numbers which are deliberately planned to represent a mathematical name of some short discussed by people who had a number system based on then and knowledge of duplication and prime numbers. Another thinks the marks where some kinds of lunar count, perhaps time reckoning from a new moon to the next new moon (Eves, 1983, p.2).

Roman emphasis on the ideal of service to society and the state brought about another extension of formal education known as the school of rhetoric. Some of the plato's suggestion for the training of philosophers, arithmetic, geometry, astronomy and music were incorporated in grammar school.

During Greek and roman time the major controversy concerning education was related to whether emphasis should be given to education for the welfare of the individual or state. But the church rejected both of these educations. This movement developed the curriculum known as the "Seven liberal arts" which formed the foundation of education throughout the middle Ages and greatly influenced the curriculum of school until today. Arithmetic, astronomy, geometry, music, grammar, rhetoric and dialectic are included in seven liberal arts. In this time, arithmetic curriculum included calendar calculation and geometry curriculum included the work of Euclid.

Rhind (or Ahmes) papyrus is a mathematical text in the form of a practical handbook which contains 79 problems and another famous Moscow papyrus contains only 25 problems which are written by Ahmes about 1700 B.C. The papyrus was acquired by the British museum. Evidently the document had originally been a roll nearly 18 ft. long and 13 inches height but it was broken into two parts with certain portion missing. The problems in these documents consist of the use of fraction, the solution of the simple equation and progression and the measurement of areas and volume (Eves, 1983, p. 34).

In golden age of Greek mathematics (from 600 B.C. to 200 B.C.), there were several progresses in mathematics. Mathematicians then like Ahmes, Thales, Pythagoras, Zeno, Hippocrates, Plato, Eucid, Archimedes, Apollanius, Ptolemy etc. played very important role for development of mathematics.

In the Dark Age, from 450 B.C. to $11^{th}$ century, civilization was very slow. Schooling was almost in non-existence. However the mathematicians like Alcuin, Bede, Boethius, Churchman Gerbert, etc. played significant role for development of mathematics.

$12^{th}$ century is the period of transformation in the context of mathematics. During this century several books of one language were translated to another language.

In $13^{th}$ and $14^{th}$ century, there were no significant tasks done in mathematics.

In $15^{th}$ century (the period of Renaissance), the projective Geometry was developed. Several old creations of mathematics were read. Mathematicians like

Nichoas Cusa, Georg Von Peurbach, Johann Muller, Nicolas Chaquel, Luca Pacioli, Johann Widman etc. played very important role for development of mathematics in 15th century. Mathematician Luca Pacioli wrote arithmetic "Suma".

A Mathematician of 17th century, Napior developed Logarithm, Descards developed modern analytic Geometry and Huygens contributed to the theory of probability. Newton and Leibniz contributed for the investigation of calculus.

Mathematicians of 18th century (Euler, Lagrange, Laplace, Cauchy, etc.) witnessed considerable further development in such subjects as trigonometry, analytic geometry, calculus, theory of numbers, theory of equation, probability, diff-equation, and Analytic mechanics, etc.

Liberation of geometry (i.e. rising of non-Euclidean Geometry) and liberation of algebra deep concern with the foundation of mathematics took place in 19th century Great mathematicians of 19th century and after (i.e. Gauss, W.R. Hamilton, peacock, Riemann, David Hilbert, Russet etc.) forced for development of mathematics.

Curriculum development activities, of 1950's and after, in the world have been concerned with three issues: 1.What mathematics should be taught in school? (The content issue) 2. How do people learn mathematics (the learning psychology issue)? And3. How should teacher teach mathematics? (The instructional strategies issue). These issues forced the revision and improvement of mathematics curriculum work (Bell, 1978, p. 37).

In 1951 the University of Illinois established the university of Illinois committee on school mathematics (UICSM) for the purpose of studying mathematics curriculum (VICSM). UICSM was the first large scale curriculum project to develop and distribute a modern (new) mathematics curriculum for secondary school mathematics; its director the late Max Beberman, is sometimes referred to as the father of new math. The project set out to produce, a curriculum emphasizing basic mathematical concepts containing a minimum of manipulative activities and emphasizing student discovery and understanding of mathematical concept and principles. UICSM, SMSG (School Mathematics Study Groups), and SSMCIS (Secondary School Mathematics Curriculum Improvement Study) are only a few of the many mathematic curriculum improvement projects which have been initiated

since 1950. After the successful sputnik in 1957, new mathematics movement forced to change the mathematics curriculum. New mathematics included the several new discoveries made since 17th century i.e. set theory, transformation, etc. New mathematics movement greatly emphasized on student thinking and discovery method. In 1972, there were 33 mathematics curriculum development projects in the United States, which affected the world's mathematics curriculum.

By 1990 and after academic committees were established for the study and recommendation of school curriculum. It was to provide a life relevant practical education. As one of the more important trends, John Dewey propounded the concept of "Education as life" rather than just "preparation of life" which also affected development for math curriculum?

The more rapidly changing world of the 20th century especially after the 1st World War brought more and more demands for a change in school curriculum practices. Urbanization, highest growth of population, mobility, transportation, industrialization, universal compulsory elementary education, the technological changes and the other symptoms of a changing social and economic milieu made it necessary for education to change.

In the middle of the 20th century, most of the world's arithmetic, general mathematics, plane geometry, algebra, solid geometry and plane trigonometry were included in secondary school mathematics program.

After 2nd World War, a movement raised known as "Education for life adjustment". The current developing science and technology has encouraged each country to complete in education.

In the current age mathematics has the high speed in this movement. It has changed its nature as the societies and learner's need are modified. To run the mathematical movement properly, different mathematical congresses and conferences have clarified the ways of learning and developing the mathematics education either psychologically or sociologically or philosophically or technologically. All the congresses have also emphasized the development of curriculum of mathematics education.

UNESCO helped many developing countries in introducing modern mathematics in their curricula. Hence most of the countries introduced new mathematics or modern mathematics in their curricula.

The mathematics curriculum should be base of on needs. It is only possible when it follows on speed of the development science and technology, Learner's interest, society's need and so on. The mathematics curriculum is needed in practical life as well.

Attitude is defined as a mental predisposition to act. It is expressed by evaluating a particular entity with some degree of favor or disfavor. Attitudes are also attached to mental categories. Mental orientations towards concepts are generally referred to as values.

Furthermore, an attitude is a point of view about a situation. It is made up of what we think, what we do and what we feel. The attitude is intellectual predisposition to contemplate, speculate and weight data, which we perceive or formulate within ourselves. Our attitude reflects the internal concepts we hold. Thus our attitude affects both our inner and outer world. The attitude is answer of 'why' to ourselves when we express a particular idea. We formulate idea within ourselves to take on the philosophical bent consent with our attitude. Therefore attitude is that what we perceive.

An attitude is a hypothetical construct that represents an individual's degree of like or dislike for an item. Attitudes are generally positive or negative views of a person on place, things of event. Attitudes are judgments. They develop on the effect, behavior and cognition model. The affective response is an emotional response that expresses an individual's degree of preference for an entity. The behavioral intention is a verbal indication or typical behavioral tendency of an individual. The cognitive response is a cognitive evaluation of the entity that constitutes an individual's beliefs about the objects. Most attitudes are the result of either direct experience of observational learning from environment.

Attitude is one of Jung's 57 definitions (Psychological Types). Jung's definition of attitude is a "readiness of the psyche to act or react in a certain way" ( Jung,[1921]1071:par.687).

In the context of Nepal, it is seems that most of the students have fear toward mathematics. So the aim of this research is to find out the secondary level students' attitude towards Mathematics in Tanahun District. The research will focus on finding the students' attitude towards mathematics and also finding the significant difference between students' attitude towards mathematics with regard to gender and geographical location of the students.

## Significance of the Study

As mathematics is an inseparable part of human civilization, it is taught at all level of school education. Besides compulsory mathematics at secondary level, mathematics is offered to willing and worthy students. Most of the educated parents in Nepal wish that their children would study mathematics. But many of them may have not known about various facts like attitude, aptitude and intelligence of their children. They are not enough capable to find out whether their child has got a favorable attitude for the study of particular subject or not. The result of which comes to us in mass failure which causes to increase the number of students drop out from the class. However, mathematics has been given a significant place in school curriculum since the implementation of new education system plan. So it has become essential to investigate the attitude of students before giving admission to the students in any particular subject. This might help decrease the problem of the increasing number of failures and an unsustainable admission. This study aims to minimize these problems. So, this research aims at finding out the attitudes of secondary level students towards mathematics.

## Statement of the Problem

This study mainly concerns with the attitude of mathematics of secondary level students. It also includes the comparison of attitude between girls and boys towards mathematics.

The statements of the problem are as follows:

- What is the attitude of students' of Tanahun District towards mathematics?
- Does the gender and location play a significant role toward the attitude of mathematics?

In order to answer these questions the study will be formally stated as, "A study on Attitudes of Secondary Level Students towards Mathematics in Tanahun District".

## Objectives of the Study

The objectives of the study are:

- To determine the attitudes of secondary level students towards mathematics.
- To compare the attitude of boys and girls towards mathematics.
- To compare the attitude of urban students and rural students towards mathematics.

## Research Hypothesis

The hypothesis of the study is:

$H_{01}$: Secondary level students of Tanahun district have positive attitude towards Mathematics.

$H_{11}$: Secondary level students of Tanahun district have negative attitude towards Mathematics.

$H_{02}$: There is no significant difference between the attitudes of boys and girls towards mathematics in Tanahun District.

$H_{12}$: There is a significant difference between the attitudes of boys and girls towards mathematics in Tanahun District.

$H_{03}$: There is no significant difference between the attitudes of urban and rural students towards mathematics of secondary level in Tanahun District.

$H_{13}$: There is a significant difference between the attitudes of urban and rural students towards mathematics of secondary level in Tanahun District.

## Delimitation of the Study

Due to the certain time expenses and other related factors the researcher will not overcome the entire fielded. It has some limitations which are as follows:

- This study is limited only in Tanahun district.
- The population of this study is limited to the students of secondary level in Tanahun district in 2069 B.S.
- The sample of this study is selected through the random sampling method
- Some of the variables like age, level of the students, family background, classroom environment and rank of the students are ignored by the researcher.

- The result of this study is generalized through an attitude scale used by the researcher which was recently developed by the Fennema and Sherman entitled "A modified Fennema Sherman mathematic attitude scale."

## Definition of the Terms

**Attitude towards mathematics:** A way of thinking or feeling and behaving towards mathematics.

**Attitude Scale:** An information form that attempts to measure the attitude or belief of an individual is known as attitude scale. According to Best and Kahn(1977), attitude scale is an inquiry form or scale used to obtain the measure of attitude of an individual towards some phenomenon. In this study, attitude scale is a scale used by the researcher to obtain the measure of attitude of students in secondary level which was developed by Fennema and Sherman entitled "A modified Fennema – Sherman mathematics attitude scale."(See Appendix A)

**Government school:** Those schools which are financed and managed by the government

**Private schools:** Those schools which are financed and managed by the Individual or group of people.

**Rural area:** The area which is far more than one hour walking distance from the highway. (Remote or country)

**Urban area:** The area which is near to highway or connected with highway.(Town or city)

# Chapter - II

## REVIEW OF RELATED LITERATURE

A review of related literature is a source for the further study of research task. During the period of more than three decades, there are many studies about the attitude of teaching profession, about the attitude of students and teachers towards mathematics; and about the achievement in different classes of the school level. It helps the researcher and gives the better ideas of surveying in the research hypothesis. Then it guides to research hypothetically nearly to the conclusion. Thus, a review of related Literature is important and essential for guideline of research or planning. Some of the literatures related to this study are listed below.

Haan (1961) writes that the teacher's attitudes as well as the understanding of mathematics influence the pupil's achievement. He further adds that the large number of teachers who dislike or fear mathematics has become a factor in children attitudes towards the subject. The effects of teacher's attitudes are widespread. Like all other attitudes, dislike of mathematics is readily communicated to children either directly or unconsciously. It contributes to reutilized teaching of mathematics and also to outright neglect.

Thomas (1978), observes that "an attitude is considered to be a property of an individual's personality, less enduring that temperament best mire enduring than motive or mood". All social scientists would also agree that attitudes cannot be directly measured or observed. So, like many other concepts intelligence, personality, traits, values and motives are "conceptual invention" or in other words, a "hypothetical construct".

Pandit, Ek Raj (1999), on his master thesis "A study of attitude of secondary level students and teachers towards geometry" concluded that the students studying in secondary level have a positive attitude toward geometry but the teachers have negative attitudes towards this subject. The secondary level boys have better attitude than those of girl's attitudes towards geometry. The mean attitude score of students towards geometry is significantly greater than that of their teacher.

Kafle (2001) studied on "a study on attitude of secondary level students and teachers towards compulsory mathematics curriculum." He selected fifteen teachers

and one hundred sixty students from Kavre district and concluded that secondary level students have a positive attitude whereas teachers have negative attitude towards secondary level compulsory mathematics curriculum. The secondary level boys and girls have similar attitude towards compulsory mathematics curriculum. The mean attitude scores of students towards compulsory mathematics have no difference than their teacher's attitude score on compulsory mathematics.

Parajuli (2001) did a research on the topic "A study on attitude of students, teachers and parents towards the new compulsory mathematics in secondary schools" with the aim to adopt mathematics as a compulsory subject in the secondary level and to compare the attitude of the students towards new compulsory mathematics with those of the rest group of people. Students with their parents and compulsory mathematics teachers were the sample of the study. Questionnaire of twenty four items were developed and data were collected. The data were analyzed by using chi-square, t-test, and z-test. Co-relation was applied between parents' attitude and teachers' attitude. He concluded that they had positive attitude towards the inclusion of trigonometry like various new topic in it. He further said that students had negative attitude towards the time allocation to this subject at secondary level.

Bhattrai L.P.(2006) on his master's thesis "Attitudes of secondary level students Towards Mathematics (A Study of Kailali district)" with the help of Modified Fennema-Sherman Mathematics Attitude Scale concluded that there was positive attitude of students towards mathematics. Girls and boys both were positive attitude towards mathematics. Similarly there was no vast difference between the attitude of boys and girls towards mathematics.

Pandit U. (2007) did a research on the topic "A study on attitudes of secondary level students towards optional mathematics curriculum in Parsa District," with the aim to find out the attitude of secondary level students towards optional maths curriculum. It was also aimed to compare the attitude of boys and girls, urban students and rural students towards optional maths curriculum. An opinionnaire was the tools for collecting data for the study. A set of opinionnaire consists of 25 statements. An opinionnaire for students was distributed to 100 students in 10 schools consisting the sample from Parsa district (5 schools from urban and 5 schools rural area). From each school, 10 students were selected. Out of 10 students, 5 were boys and 5 were girls.

The $\chi^2$- test was used to find out the attitude of secondary level students and t-test was used to compare the attitude of boys and girls, urban and rural students. Both the test was applied at 0.05 level of significance.

Shrestha A. (2010) did another research on the topic, "Students' attitude on mathematics of different occupational parents' (A study on Tanahun District)" with the aim to find out the attitude of secondary level students of different occupational parents towards mathematics. It was also aimed to compare the attitude of students according to their parent's occupation and also the attitude of boys and girls towards mathematics.

An opinionnaire for Fennema and Sherman mathematics scale was used to collect the data for the study. The set of opinionnaire consisting 48 statements with four scales: confident scale, usefulness scale, male domain scale and teachers perception scale; each of which contain six positive and six negative attitude statements. The opinionnaire was distributed for 245 students of five schools: two private and three public schools.

Mean and percentage were used to determine the attitude of different occupational parents and also to find the attitude of boy and girl students of different occupational parents towards mathematics. 'ANNOVA table ratio test (f-test)' was used to compare the attitude of students of different occupation of the parent and 't-test' was applied to compare the attitude of boys and girls. Both the tests were applied at 0.05 level of significant.

Attitudes are inclinations and predispositions that guide an individual's behavior (Rubinstein, 1986) and persuade to an action that can be evaluated as either positive or negative (Fishbein & Ajzen, 1975). It develops and changes with time (Rubinstein, 1986). When reviewing literature on students' attitude towards mathematics, it reveals that several factors play a vital role in influencing student's attitude. These factors can be categorized into three distinctive groups. Firstly, factors associated with the students themselves; some of these factors include student's mathematical achievement score (Köğce et al, 2009), anxiety towards mathematics, student's self efficacy and self concept, extrinsic motivation (Tahar et al, 2010) and experiences at high school (Klein, 2004; Bobis & Cusworth, 1994). Secondly, the factors that is associated with the school, teacher and teaching; some of these factors

that influence attitudes are teaching materials used by teacher, teachers ‟classroom management, teachers‟ content knowledge and personality, teaching topics with real life enriched examples, other student's opinions about mathematics courses (Yilmaz, Altun & Olkun, 2010), teaching methods, reinforcement (Papanastasiou, 2000), receiving private tuition (Köğce et al, 2009), teachers' beliefs towards mathematics (Cater & Norwood, 1997) and teachers' attitude toward mathematics (Ford, 1994, Karp, 1991). Thirdly, factors from the home environment and society also affect students' attitude towards mathematics. Factors such as educational background of parents, occupation of parents (Köğce et al, 2009) and parental expectations (Tobias, 1993) play a crucial role in influencing students' attitude towards mathematics. Due to these several factors students have different attitude towards mathematics. More often, the public image of mathematics is labeling it as a difficult, cold, abstract, theoretical and ultra rational subject (Ernest, 2004).

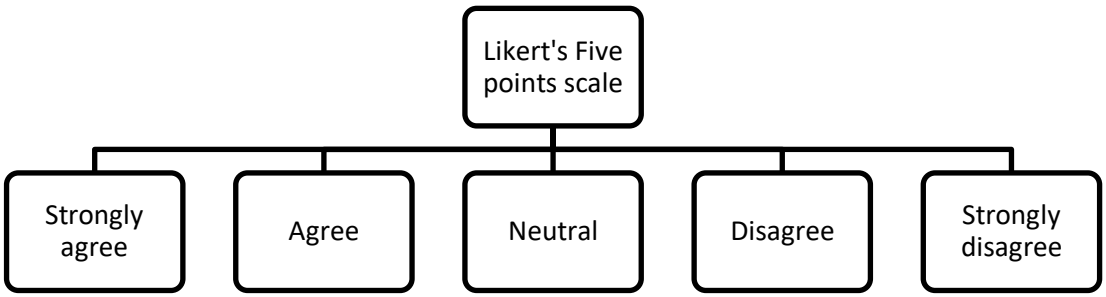
However, some studies show that students have a relatively positive attitude towards mathematics (Tezer & Karasel, 2010; Yilmaz et al, 2010; Fan, Quek, Yan, Mei, Lionel & Yee, 2005). Sometimes, Mathematics is also considered as very important and largely masculine subject (Ernest, 2004). Several studies gives evidence that compared to boys, girls lack confidence in doing mathematical sums and viewed mathematics as a male domain (Meelissen & Luyten, 2008; Odell & Schumacher, 1998; Hyde, Fennema, Ryan, Frost, & Hopp, 1990). But there are many studies that suggest that there is no significant difference between attitude towards mathematics among male and female students (Mohd et al, 2011; Köğce et al, 2009; Nicolaidou & Philippou, 2003). And there are some other studies which suggest that the attitude of the participants of their study towards mathematics was more positive in the third year than the first year (Grootenber & Lowrie, 2002) and there is a difference between attitude in the grades 6, 7 and 8 (Köğce et al, 2009). Hence it can be said that students' attitude towards mathematics is very subjective and varies it among the students. Several studies have been conducted to find out the relationship between attitude towards mathematics and academic achievement of the students. Most of these studies showed that there is a positive correlation between students attitude towards mathematics and academic achievement of students (Mohd et al, 2011; Bramlett & Herron, 2009; Papanastasiou, 2000; Ma & Kishor, 1997) and also achievement in problem solving (Nicolaidou & Philippou, 2003), The studies have

also shown that students attitude towards problem solving in terms of patience, confidence and willingness has a positive relation with students' mathematics achievement (Mohd et al, 2011).

## Conceptual Frame Work

Being a mathematics student, I used to think that why most of the students have very low knowledge and interest in mathematics? Although they agree that it is a useful subject in their life but they show indifference towards mathematics, why? is the unsolvable question in my mind. So I thought to do a research in the field of attitude toward mathematics and began to search the suitable questionnaire for it. While searching, I found, in the 1970's, Elizabeth Fennema and Julia A. Sherman constructed the attitude scale to study student's attitude towards mathematics. There are four scales namely confidence scale, usefulness scale, scales that measures mathematics as male domain and teacher perception scale, which I decided to use for my research and ultimately used.

Each of the above scale consists of twelve items. Six of them measure positive attitude and six of them measure negative attitude. Fennema and Shreman (1977) using the Fennema and Sherman Mathematics Scale, found several gender differences in secondary level students' attitude. The scale could give a teacher and individual student useful information about the particular student's attitudes towards mathematics as well as other subjects. In this way, in this research I'm going to use this standard opennaire in which the following five point scale is used.



# Chapter - III

# METHOD AND PROCEDURES

## Design of the Study

One of the most important parts of research is research design and it is a useful bridge to solve the research problem in systematic way. It describes the method and process applied to the entire aspect of the study. It is a way to gather information. Different tools and techniques are used in different phases of the study. Thus, the framework of the methodology contains population, sample, tools, data collection procedure and data analysis procedure.

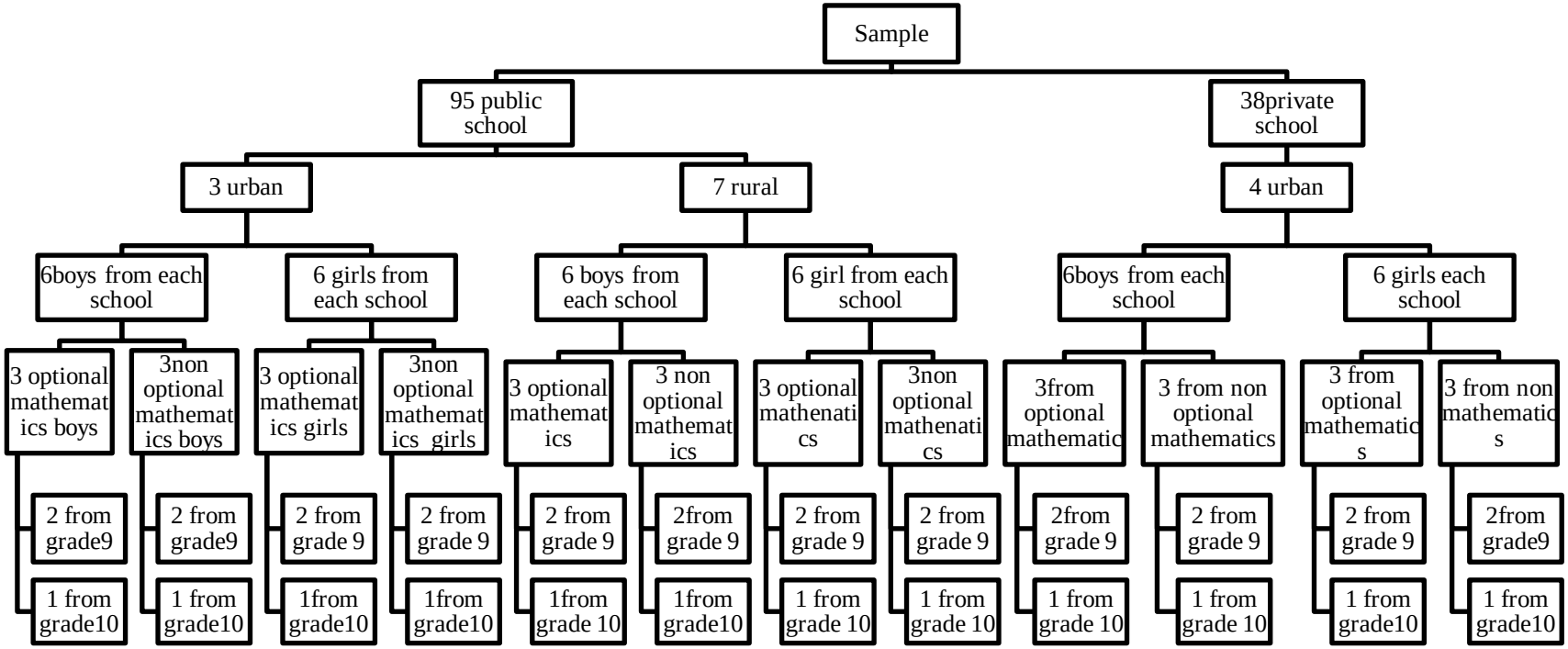
This study is designed as survey type authenticated by qualitative phenomena. Survey research design is probably best adapted to obtaining personal and social facts, believes and attitude.

## Population of the Study

There are 95 government and 38 private secondary school in Tanahun district and near about 13013 students(DE,2068) studying at grade nine and ten in these school in the academic session 2069.The population of this study will be all the students of both public and private schools at secondary level in Tanahun district.

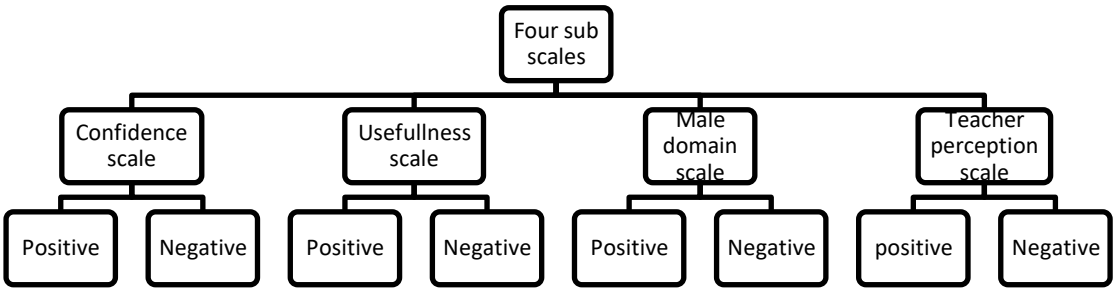
## Sample of the Study

The sample of the study was 168 students of grade 9 & 10 studying 14 public and 4 private schools of Tanahun district in the academic year 2069.10 out of 95 public schools and 4 out of 38 private schools were selected randomly for the sample. Among 10 public schools 3had been taken from urban and 7 from rural area and most of the private schools are located in urban area so 4 private schools had been taken from urban area. In this way, 7 from urban and 7 from rural area had been selected. From each school 12 students had been selected (6 boys and 6 girls). Out of 6 boys and 6 girls, 3/3 from optional mathematics and 3/3 from non optional mathematics students had been selected. Among them, 2 from grade nine and 1 from grade ten had been selected from each group. If there was no students studying optional mathematics or vice versa, only the targeted students had been participated in this inquiry.


Sample
95 public school
38private school
3 urban
7 rural
4 urban
6boys from each school
6 girls from each school
6 boys from each school
6 girl from each school
6boys from each school
6 girls each school
3 optional mathematics boys
3non optional mathematics boys
3 optional mathematics girls
3non optional mathematics girls
3 optional mathematics
3 non optional mathematics
3 optional mathenatics
3non optional mathenatics
3from optional mathematic
3 from non optional mathematics
3 from optional mathematics
3 from non mathematics
2 from grade9
1 from grade10
2 from grade 9
1from grade10
2from grade 9
1 from grade 10

## Tools

The collection of data for the study is done with the help of a list of questions entitled " *A modified Fennema-Sherman Mathematics Attitude Scale* ". The scale consists of four sub-scales. Each of these four sub-scales consists of twelve questions. Six of them measures positive attitude and Six of them measures negative attitude. Thus the scale contains forty eight statements. For each item, five options strongly agree, agree, neutral, disagree and strongly disagree are used. 48 statements are presented as below table by showing +ve and –ve statement. The final questionnaire is presented in appendix- A




**Confidence Scale**

| | | |
|---|---|---|
| 1 | I am sure that I can learn math. | Positive |
| 4 | I don't think I could do advanced math. | Negative |
| 8 | Math is hard for me. | Negative |
| 12 | I am sure of myself when I do math. | Positive |
| 19 | I'm not the type to do well in math. | Negative |
| 23 | Math has been my worst subject. | Negative |
| 25 | I think I could handle more difficult math. | Positive |
| 32 | Most subjects I can handle OK, but I just can't do a good job with math. | Negative |
| 33 | I can get good grades in math. | Positive |
| 37 | I know I can do well in math. | Positive |
| 41 | I am sure I could do advanced work in math. | Positive |
| 43 | I'm no good in math. | Negative |

**Usefulness Scale**

| | | |
|---|---|---|
| 3 | Knowing mathematics will help me earn a living. | Positive |
| 5 | Math will not be important to me in my life's work. | Negative |

| | | |
|---|---|---|
| 10 | I'll need mathematics for my future work. | Positive |
| 13 | I don't expect to use much math when I get out of school. | Negative |
| 17 | Math is a worthwhile, necessary subject. | Positive |
| 21 | Taking math is a waste of time. | Negative |
| 27 | I will use mathematics in many ways as an adult. | Positive |
| 29 | I see mathematics as something I won't use very often when I get out of high school. | Negative |
| 34 | I'll need a good understanding of math for my future work. | positive |
| 39 | Doing well in math is not important for my future. | Negative |
| 42 | Math is not important for my life. | Negative |
| 44 | I study math because I know how useful it is. | Positive |

**Male domain Scale**

| | | |
|---|---|---|
| 6 | Males are not naturally better than females in math. | Positive |
| 9 | It's hard to believe a female could be a genius in mathematics. | Negative |
| 11 | When a woman has to solve a math problem, she should ask a man for help. | Negative |
| 15 | Women can do just as well as men in math. | Positive |
| 18 | I would have more faith in the answer for a math problem solved by a man than a woman. | Negative |
| 24 | Women who enjoy studying math are a little strange. | Negative |
| 28 | Females are as good as males in geometry. | Positive |
| 31 | Women certainly are smart enough to do well in math. | Positive |
| 36 | I would expect a woman mathematician to be a forceful type of person. | Negative |
| 38 | Studying math is just as good for women as for men. | Positive |
| 46 | I would trust a female just as much as I would trust a male to solve important math problems. | Positive |
| 48 | I feel boar in the class of female mathematics teacher. | Negative |

**Teacher Perception Scale**

| | | |
|---|---|---|
| 2 | My teachers have been interested in my progress in math. | Positive |
| 7 | Getting a teacher to take me seriously in math is a problem. | Negative |
| 14 | I would talk to my math teachers about a career that uses math. | Negative |
| 16 | It's hard to get math teachers to respect me. | Negative |
| 20 | My teachers have encouraged me to study more math. | Positive |
| 22 | I have a hard time getting teachers to talk seriously with me about math. | Negative |
| 26 | My teachers think advanced math will be a waste of time for me. | Negative |
| 30 | I feel that math teachers ignore me when I try to talk about something serious. | Negative |
| 35 | My teachers want me to take all the math I can. | Positive |
| 40 | My teachers would not take me seriously if I told them I was | Negative |

| | | |
|---|---|---|
| | interested in a career in science and mathematics. | |
| 45 | Math teachers have made me feel I have the ability to go on in mathematics. | Positive |
| 47 | My teachers think I'm the kind of person who could do well in math. | Positive |

## Data Collection Procedures

The researcher visited the selected schools and met the headmasters and mathematics teacher of the respective schools and also took permission for the administration of the scale on the students during their mathematics period with the help of maths teacher. The scale was administrated in sampled students of grade nine and ten during their regular mathematics period in the presence of researcher and their mathematics teacher.

## Scoring Procedure

Each positive statement receives the score based on the basis of Likert's five points scale i.e. five points for strongly agree, four point for agree, three points for neutral, two points for disagree and one point for strongly disagree. Similarly, the scoring procedure of negative items is reversed.

## Procedure of Data Analysis

All information was collected from primary sources. Collected data was scored with the help of Likert's five point scale. After quantifying the collected data, '$\chi^2$- test' was used for each item to find the attitude of students towards mathematics and calculating the mean and standard deviation. Then two tailed 'z-test' was applied to compare the attitude of boys and girls towards mathematics and also to compare the attitude of rural and urban area students towards mathematics at 0.5level.

The following statistical techniques were applied to verify the hypothesis of the study.

The following device '$\chi^2$- test' was applied to each item of a set of opinionnaire to find the opinion of boys and girls towards mathematics. The computational formula was used for calculation of $\chi^2$-test:

$$\chi = \frac{\sum\left|(f_0 - f_e)^2\right|}{f_e}$$ where $f_0$ =observed frequency

$f_e$ = expected frequency

The statistical tools 'z-test' was applied to compare the attitude of boys and girls towards mathematics. The following computational formula was used for calculation of z- test at 0.05level:

$$z = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}$$

Where, $\overline{X_1}$ =Mean of the first sample

$\overline{X_2}$ = Mean of the second sample

$N_1$ = No. of students in first sample

$N_2$ =No. of students in second sample

$S_1^2$ = variance of the first sample

$S_2^2$ = variance of second sample

Similarly, it also compared the attitude of rural and urban students towards mathematics using z-test.

# Chapter –IV

## ANALYSIS AND INTERPRETATION OF DATA

The necessary data were collected from secondary level students of Tanahun district as described in the chapter III. This chapter presents the result of statistical analysis done together with their interpretation. For convenience and clarity in presentation, the results have been presented under the followings major subheading which corresponds to the objectives of the study.

- To determine the attitudes of secondary level students towards mathematics.
- To compare the attitude of boys and girls towards mathematics.
- To compare the attitude of urban students and rural students towards mathematics.

### Secondary Level Students' Attitudes Towards Mathematics.

The first objective of the study was to find out the attitude of secondary level students towards mathematics. In order to achieve this objective, the $\chi^2$-value of 48 statements at 0.05 level of significance have been analyzed which are tabulated in the following table.

**Table no. 1(i)**

**$\chi^2$-value of statements of administered attitude scale to secondary level students**

| S.N. | STATEMENTS | SA | A | N | D | SD | $\chi^2$ | Decision |
|---|---|---|---|---|---|---|---|---|
| 1 | I am sure that I can learn math. | 97 | 65 | 2 | 1 | 0 | 243.92 | s |
| 2 | My teachers have been interested in my progress in math. | 74 | 73 | 20 | 1 | 0 | 165.51 | s |
| 3 | Knowing mathematics will help me earn a living. | 89 | 60 | 14 | 4 | 0 | 183.2 | s |
| 4 | I don't think I could do advanced math. | 2 | 22 | 21 | 70 | 51 | 86.893 | s |
| 5 | Math will not be important to me in my life's work. | 0 | 5 | 8 | 54 | 101 | 225.04 | s |
| 6 | Males are not naturally better than females in math. | 2 | 6 | 45 | 65 | 50 | 93.607 | s |
| 7 | Getting a teacher to take me seriously in math is a problem. | 9 | 19 | 26 | 62 | 52 | 60.155 | s |
| 8 | Math is hard for me. | 9 | 25 | 23 | 69 | 41 | 62.482 | s |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 9 | It’s hard to believe a female could be a genius in mathematics. | 7 | 15 | 27 | 46 | 71 | 78.857 | s |
| 10 | I’ll need mathematics for my future work. | 90 | 63 | 10 | 4 | 1 | 194.68 | s |
| 11 | When a woman has to solve a math problem, she should ask a man for help. | 20 | 29 | 29 | 50 | 39 | 15.637 | s |
| 12 | I am sure of myself when I do math. | 40 | 89 | 26 | 7 | 4 | 141.42 | s |
| 13 | I don’t expect to use much math when I get out of school. | 9 | 22 | 21 | 68 | 47 | 67.304 | s |
| 14 | I would talk to my math teachers about a career that uses math. | 46 | 84 | 17 | 18 | 2 | 125.34 | s |
| 15 | Women can do just as well as men in math. | 128 | 25 | 4 | 3 | 7 | 342.42 | s |
| 16 | It's hard to get math teachers to respect me. | 12 | 31 | 26 | 60 | 37 | 36.893 | s |
| 17 | Math is a worthwhile, necessary subject. | 124 | 35 | 3 | 0 | 6 | 327.42 | s |
| 18 | I would have more faith in the answer for a math problem solved by a man than a woman. | 7 | 13 | 36 | 45 | 67 | 70.929 | s |
| 19 | I'm not the type to do well in math. | 6 | 2 | 17 | 61 | 81 | 149.8 | s |
| 20 | My teachers have encouraged me to study more math. | 96 | 59 | 9 | 0 | 4 | 212.77 | s |
| 21 | Taking math is a waste of time. | 2 | 0 | 9 | 29 | 127 | 341.59 | s |
| 22 | I have a hard time getting teachers to talk seriously with me about math. | 6 | 32 | 48 | 46 | 34 | 33.5 | s |
| 23 | Math has been my worst subject. | 3 | 7 | 7 | 52 | 97 | 199.69 | s |
| 24 | Women who enjoy studying math are a little strange. | 14 | 27 | 22 | 55 | 47 | 35.708 | s |
| 25 | I think I could handle more difficult math. | 37 | 79 | 26 | 17 | 2 | 101.33 | s |
| 26 | My teachers think advanced math will be a waste of time for me. | 2 | 6 | 16 | 65 | 77 | 147.01 | s |
| 27 | I will use mathematics in many ways as an adult. | 41 | 89 | 25 | 8 | 2 | 144.4 | s |
| 28 | Females are as good as males in geometry. | 78 | 68 | 13 | 3 | 5 | 158.73 | s |
| 29 | I see mathematics as something I won't use very often when I get out of high school. | 4 | 14 | 15 | 79 | 55 | 122.78 | s |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 30 | I feel that math teachers ignore me when I try to talk about something serious. | 14 | 26 | 26 | 57 | 50 | 39.173 | s |
| 31 | Women certainly are smart enough to do well in math. | 79 | 57 | 20 | 7 | 4 | 130.28 | s |
| 32 | Most subjects I can handle OK, but I just can't do a good job with math. | 11 | 34 | 18 | 51 | 51 | 40.47 | s |
| 33 | I can get good grades in math. | 46 | 29 | 24 | 2 | 5 | 62.012 | s |
| 34 | I'll need a good understanding of math for my future work. | 101 | 52 | 10 | 3 | 2 | 219.44 | s |
| 35 | My teachers want me to take all the math I can. | 84 | 60 | 12 | 8 | 4 | 155.81 | s |
| 36 | I would expect a woman mathematician to be a forceful type of person. | 8 | 26 | 60 | 42 | 29 | 44.696 | s |
| 37 | I know I can do well in math. | 71 | 79 | 12 | 2 | 4 | 172.65 | s |
| 38 | Studying math is just as good for women as for men. | 117 | 43 | 2 | 0 | 4 | 299.04 | s |
| 39 | Doing well in math is not important for my future. | 3 | 2 | 13 | 44 | 105 | 225.16 | s |
| 40 | My teachers would not take me seriously if I told them I was interested in a career in science and mathematics. | 9 | 12 | 23 | 34 | 90 | 129.92 | s |
| 41 | I am sure I could do advanced work in math. | 24 | 84 | 43 | 14 | 2 | 122.13 | s |
| 42 | Math is not important for my life. | 1 | 1 | 8 | 44 | 114 | 278.37 | s |
| 43 | I'm no good in math. | 2 | 13 | 24 | 72 | 53 | 100.18 | s |
| 44 | I study math because I know how useful it is. | 92 | 62 | 8 | 2 | 3 | 202.6 | s |
| 45 | Math teachers have made me feel I have the ability to go on in mathematics. | 46 | 88 | 22 | 8 | 2 | 145.88 | s |
| 46 | I would trust a female just as much as I would trust a male to solve important math problems. | 95 | 61 | 8 | 3 | 1 | 213.55 | s |
| 47 | My teachers think I'm the kind of person who could do well in math. | 47 | 87 | 27 | 6 | 1 | 145.81 | s |
| 48 | I feel boring in the class of female mathematics teacher. | 1 | 5 | 15 | 40 | 107 | 227.83 | s |

Note: s= significant, Critical region, $\chi^2_{a,v} = \chi^2_{0.05,4} = 9.488$ is the degree of freedom.

The data of table 1(i) have been presented with descending order of $\chi^2$-value on the table 1(ii) below.

**Table no. 1(ii)**

**$\chi^2$ - Value of Statements of Administered Attitude Scale to Secondary Level Students in Descending Order**

**(According to Descending order of $\chi^2$)**

| S.N. | STATEMENTS | SA | A | N | D | SD | $\chi^2$ | Decision |
|---|---|---|---|---|---|---|---|---|
| 15 | Women can do just as well as men in math. | 128 | 25 | 4 | 3 | 7 | 342.42 | s |
| 21 | Taking math is a waste of time. | 2 | 0 | 9 | 29 | 127 | 341.59 | s |
| 17 | Math is a worthwhile, necessary subject. | 124 | 35 | 3 | 0 | 6 | 327.42 | s |
| 38 | Studying math is just as good for women as for men. | 117 | 43 | 2 | 0 | 4 | 299.04 | s |
| 42 | Math is not important for my life. | 1 | 1 | 8 | 44 | 114 | 278.37 | s |
| 1 | I am sure that I can learn math. | 97 | 65 | 2 | 1 | 0 | 243.92 | s |
| 48 | I feel boring in the class of female mathematics teacher. | 1 | 5 | 15 | 40 | 107 | 227.83 | s |
| 39 | Doing well in math is not important for my future. | 3 | 2 | 13 | 44 | 105 | 225.16 | s |
| 5 | Math will not be important to me in my life's work. | 0 | 5 | 8 | 54 | 101 | 225.04 | s |
| 34 | I'll need a good understanding of math for my future work. | 101 | 52 | 10 | 3 | 2 | 219.44 | s |
| 46 | I would trust a female just as much as I would trust a male to solve important math problems. | 95 | 61 | 8 | 3 | 1 | 213.55 | s |
| 20 | My teachers have encouraged me to study more math. | 96 | 59 | 9 | 0 | 4 | 212.77 | s |
| 44 | I study math because I know how useful it is. | 92 | 62 | 8 | 2 | 3 | 202.6 | s |
| 23 | Math has been my worst subject. | 3 | 7 | 7 | 52 | 97 | 199.69 | s |
| 10 | I'll need mathematics for my future work. | 90 | 63 | 10 | 4 | 1 | 194.68 | s |
| 3 | Knowing mathematics will help me earn a living. | 89 | 60 | 14 | 4 | 0 | 183.2 | s |
| 37 | I know I can do well in math. | 71 | 79 | 12 | 2 | 4 | 172.65 | s |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2 | My teachers have been interested in my progress in math. | 74 | 73 | 20 | 1 | 0 | 165.51 | s |
| 28 | Females are as good as males in geometry. | 78 | 68 | 13 | 3 | 5 | 158.73 | s |
| 35 | My teachers want me to take all the math I can. | 84 | 60 | 12 | 8 | 4 | 155.81 | s |
| 19 | I'm not the type to do well in math. | 6 | 2 | 17 | 61 | 81 | 149.8 | s |
| 26 | My teachers think advanced math will be a waste of time for me. | 2 | 6 | 16 | 65 | 77 | 147.01 | s |
| 45 | Math teachers have made me feel I have the ability to go on in mathematics. | 46 | 88 | 22 | 8 | 2 | 145.88 | s |
| 47 | My teachers think I'm the kind of person who could do well in math. | 47 | 87 | 27 | 6 | 1 | 145.81 | s |
| 27 | I will use mathematics in many ways as an adult. | 41 | 89 | 25 | 8 | 2 | 144.4 | s |
| 12 | I am sure of myself when I do math. | 40 | 89 | 26 | 7 | 4 | 141.42 | s |
| 31 | Women certainly are smart enough to do well in math. | 79 | 57 | 20 | 7 | 4 | 130.28 | s |
| 40 | My teachers would not take me seriously if I told them I was interested in a career in science and mathematics. | 9 | 12 | 23 | 34 | 90 | 129.92 | s |
| 14 | I would talk to my math teachers about a career that uses math. | 46 | 84 | 17 | 18 | 2 | 125.34 | s |
| 29 | I see mathematics as something I won't use very often when I get out of high school. | 4 | 14 | 15 | 79 | 55 | 122.78 | s |
| 41 | I am sure I could do advanced work in math. | 24 | 84 | 43 | 14 | 2 | 122.13 | s |
| 25 | I think I could handle more difficult math. | 37 | 79 | 26 | 17 | 2 | 101.33 | s |
| 43 | I'm no good in math. | 2 | 13 | 24 | 72 | 53 | 100.18 | s |
| 6 | Males are not naturally better than females in math. | 2 | 6 | 45 | 65 | 50 | 93.607 | s |
| 4 | I don’t think I could do advanced math. | 2 | 22 | 21 | 70 | 51 | 86.893 | s |
| 9 | It’s hard to believe a female could be a genius in mathematics. | 7 | 15 | 27 | 46 | 71 | 78.857 | s |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 18 | I would have more faith in the answer for a math problem solved by a man than a woman. | 7 | 13 | 36 | 45 | 67 | 70.929 | s |
| 13 | I don’t expect to use much math when I get out of school. | 9 | 22 | 21 | 68 | 47 | 67.304 | s |
| 8 | Math is hard for me. | 9 | 25 | 23 | 69 | 41 | 62.482 | s |
| 33 | I can get good grades in math. | 46 | 29 | 24 | 2 | 5 | 62.012 | s |
| 7 | Getting a teacher to take me seriously in math is a problem. | 9 | 19 | 26 | 62 | 52 | 60.155 | s |
| 36 | I would expect a woman mathematician to be a forceful type of person. | 8 | 26 | 60 | 42 | 29 | 44.696 | s |
| 32 | Most subjects I can handle OK, but I just can't do a good job with math. | 11 | 34 | 18 | 51 | 51 | 40.47 | s |
| 30 | I feel that math teachers ignore me when I try to talk about something serious. | 14 | 26 | 26 | 57 | 50 | 39.173 | s |
| 16 | It's hard to get math teachers to respect me. | 12 | 31 | 26 | 60 | 37 | 36.893 | s |
| 24 | Women who enjoy studying math are a little strange. | 14 | 27 | 22 | 55 | 47 | 35.708 | s |
| 22 | I have a hard time getting teachers to talk seriously with me about math. | 6 | 32 | 48 | 46 | 34 | 33.5 | s |
| 11 | When a woman has to solve a math problem, she should ask a man for help. | 20 | 29 | 29 | 50 | 39 | 15.637 | s |

Note: S= Significant.

The result of table 1(i) shows that the $\chi^2$-value of all 48 statements are significant at 0.05 level of significant which shows that the secondary level students had positive attitude towards mathematics.

In the table 1(ii) the researcher has arranged all the statements in descending order in terms of their $\chi^2$-value.

From the table, the statement no.15" Women can do just as well as men in math" with $\chi^2$-value 342.42 is highly significant at 0.05 level. It showed that great majority of students (91.07%) were in favour of women can do just as well as men in math.

Similarly, the second highly significant statement "Taking math is a waste of time." With $\chi^2$- value 341.59 at 0.05 level. It was a negative statement and majority of the students 75.59% strongly disagreed and 17.26% students disagreed for this statement.It showed that in total 92.85% students rejected that taking math is a waste of time.

The third significant statement no.17" Math is a worthwhile, necessary subject." with $\chi^2$-327.42 at 0.05 level showed that majority of the students (73.81%) strongly agreed and 20.83% of the students agreed. So, it indicates that the students have positive view about this statement.

The fourth significant statement no.38" Studying math is just as good for women as for men." with $\chi^2$- value 299.04 at 0.05 level shows that 69.64% of the students strongly agreed and 25.59% of the students agreed with this statements. It indicates that most of the students are in favour of this statement.

The fifth significant statement no.42" Math is not important for my life." with $\chi^2$- value 278.37 at 0.05 level showed that 67.85% of the students strongly disagreed and 26.19% of the students disagreed with this statement. So altogether 94.04% of the student disagreed with this statement. It means they think math is important for them throughout the life.

The sixth significant statement no.1"I am sure that I can learn math." with $\chi^2$- value 243.92 at 0.05 level showed that 57.73% of the student strongly agreed with this statement and 38.69% student agreed with this statement. This proves that majority of the students are confident to learn mathematics and they are not in any confusion to learn mathematics.

Similarly statement no. 48" I feel boring in the class of female mathematics teacher." with $\chi^2$- value 227.83 at 0.05 level showed that 63.69% of the student strongly disagreed with this statement and 23.81% of the student disagreed with it. It means the student do not feel boring in the class of female mathematics teacher.

Statement no. 39 "Doing well in math is not important for my future." with $\chi^2$- value 225.16 at 0.05 level showed that 62.5% of the students strongly disagreed with this statement and 26.19% of the students disagreed with this, it means doing well in maths is important in the future.

Statement no. 5 "Math will not be important to me in my life's work." with $\chi^2$- value 225.05 at 0.05 level showed that 60.11% of the students strongly disagreed with this and 32.14% of the students disagreed about it and nobody strongly agreed with this statement. It means everybody thinks that math is an important subject in their life.

Statement no. 34 "I'll need a good understanding of math for my future work." with $\chi^2$- value 219.44 at 0.05 level showed that 60.11% of the students strongly agreed with this statement and 30.95% of the students agreed with it. It shows that they feel they need a good understanding of math in their future work.

Statement no. 46 "I would trust a female just as much as I would trust a male to solve important math problems." with $\chi^2$- value 213.55 at 0.05 level showed that 56.54% of the students strongly agreed and 36.30% of the students agreed with this statement. It means both male and female can solve the mathematical problem equally and there are no gender differences in solving mathematics.

Statement no. 20 "My teachers have encouraged me to study more math." with $\chi^2$- value 212.77 at 0.05 level showed that 57.14% of the students strongly agreed and 35.11% of the students agreed with this statement. It means that they are satisfied with their teachers encouragement in studying mathematics.

Statement no. 44 "I study math because I know how useful it is." with $\chi^2$- value 202.60 at 0.05 level showed that 54.76% of the students strongly agreed and 36.90% of all the students agreed with this statement that they know about the usefulness of mathematics.

Statement no. 23 "Math has been my worst subject." with $\chi^2$- value 199.69 at 0.05 level showed that 57.74% of the students strongly disagreed and 30.95% of the students disagreed with this statement. It means math is not the worst subject for them.

Statement no. 10 "I'll need mathematics for my future work" with $\chi^2$- value 194.68 at 0.05 level showed that 53.57% of the students strongly agreed and 37.50% of the students agreed with this statement. It means they feel that they need mathematics in their future work.

Statement no. 3 "Knowing mathematics will help me earn a living" with $\chi^2$- value 183.20 at 0.05 level showed that 52.97% of the students strongly agreed and 35.71% of the student agreed with this statement that they know mathematics will help them earn a living.

Statement no. 37 "I know I can do well in math" with $\chi^2$- value 172.65 at 0.05 level showed that 42.26% of the students strongly agreed and 47.02% of the students agreed with this statement. It means they hope that they can do well in math.

Statement no. 2 "My teachers have been interested in my progress in math" with $\chi^2$- value 165.51 at 0.05 level showed that 44.05% of the students strongly agreed and 43.45% of the students agreed with this statement. It means that their teachers have been interested in their progress in math.

Statement no. 28 "Females are as good as males in geometry" with $\chi^2$- value 158.73 at 0.05 level showed that 46.43% of the students strongly agreed and 40.48% of the students agreed with this statement that in geometry females are as good as males, i.e. there is no gender differences in learning geometry.

Statement no. 35 "My teachers want me to take all the math I can" with $\chi^2$- value 155.81 at 0.05 level showed that 50% of the students strongly agreed and 35.71% of the students agreed with this statement. It means that their teacher wanted them to take all the math they can.

Similarly statement no. 33 "I can get good grades in math" with $\chi^2$- value 152.73 at 0.05 level showed that 27.38% of the students strongly agreed, 52.97% of the students agreed and 14.29% of the students are neutral with this statement. It means 80.35% of the students agree that they can get good grades in mathematics.

Statement no. 19 "I'm not the type to do well in math" with $\chi^2$- value 149.80 at 0.05 level showed that 48.21% of the students strongly disagreed and 36.31% of the students disagreed with this statement. It means that they're of the type to do well in math.

Statement no. 26 "My teachers think advanced math will be a waste of time for me" with $\chi^2$- value 147.01 at 0.05 level showed that 45.83% of the students

strongly disagreed and 38.69% of the students disagreed with this statement. It means their teachers thought advanced math would not be waste of time for them.

Statement no. 45 "Math teachers have made me feel I have the ability to go on in mathematics" with $\chi^2$- value 145.88 at 0.05 level showed that 27.38% of the students strongly agreed and 52.38% of the students agreed with this statement that they're influenced by their mathematics teacher. Since their mathematics teacher made them they had the ability to go on in mathematics.

Statement no. 47 "My teachers think I'm the kind of person who could do well in math" with $\chi^2$- value 145.81 at 0.05 level showed that 27.98% of the students strongly agreed and 51.79% of the students agreed with this statement that their teachers thought they're the kind of person who could do well in math.

Statement no. 27 "I will use mathematics in many ways as an adult" with $\chi^2$- value 144.40 at 0.05 level showed that 24.41% of the students strongly agreed and 52.97% of the students agreed with this statement that they'd use mathematics in many ways as an adult.

Statement no. 12 "I am sure of myself when I do math" with $\chi^2$- value 141.42 at 0.05 level showed that 23.81% of the students strongly agreed and 52.98% of the students agreed with this statement that they're sure of themselves when they did math.

Statement no. 31 "Women certainly are smart enough to do well in math" with $\chi^2$- value 130.28 at 0.05 level showed that 47.02% of the students strongly agreed and 33.93% of the students agreed with this statement that they believe women are certainly smart enough to do well in math.

Statement no. 40 "My teachers would not take me seriously if I told them I was interested in a career in science and mathematics" with $\chi^2$- value 129.92 at 0.05 level showed that 57.57% of the students strongly disagreed and 20.24% of the students disagreed with this statement so that their teachers would not take them seriously if they had told to their teacher that they were interested in a career in science and mathematics.

Statement no. 14 "I would talk to my math teachers about a career that uses math" with $\chi^2$- value 125.34 at 0.05 level showed that 27.38% of the students strongly agreed and 50.00% of the students agreed with this statement that they'd talk to their math teachers about a career that uses math.

Statement no. 29 "I see mathematics as something I won't use very often when I get out of high school." with $\chi^2$- value 122.78 at 0.05 level showed that 32.74% of the students strongly disagreed and 47.02% of the students disagreed with this statement that they see mathematics as a useful even after high school.

Statement no. 41 " I am sure I could do advanced work in math " with $\chi^2$- value 122.13 at 0.05 level showed that 14.28% of the students strongly agreed, 50.00% of the students agreed and 25.59% of the students are neutral with this statement.

Statement no. 25 "I think I could handle more difficult math." with $\chi^2$- value 101.33 at 0.05 level showed that 22.02% of the students strongly agreed and 47.02% of the students agreed with this statement.

Statement no. 43 "I'm no good in math" with $\chi^2$- value 100.18 at 0.05 level showed that 31.54% of the students strongly disagreed and 42.56% of the students disagreed with this statement that they feel they're good in math.

Statement no. 6 "Males are not naturally better than females in math" with $\chi^2$- value 93.61 at 0.05 level showed that 29.76% of the students strongly disagreed, 38.69% of the students disagreed and 26.79% of the students are neutral with this statement.

Statement no. 4 "I don’t think I could do advanced math" with $\chi^2$- value 86.89 at 0.05 level showed that 30.36% of the students strongly disagreed and 41.67% of the students disagreed with this statement.

Statement no. 9 "It’s hard to believe a female could be a genius in mathematics" with $\chi^2$- value 78.86 at 0.05 level showed that 42.26% of the students strongly disagreed and 27.38% of the students disagreed with this statement.

Statement no. 18 "I would have more faith in the answer for a math problem solved by a man than a woman" with $\chi^2$- value 70.93 at 0.05 level showed that

39.88% of the students strongly disagreed and 26.79% of the students disagreed with this statement that they'd trust the answer given by both male and female.

Statement no. 13 "I don't expect to use much math when I get out of school" with $\chi^2$- value 67.30 at 0.05 level showed that 27.97% of the students strongly disagreed and 40.47% of the students disagreed with this statement.

Similarly statement no. 8 "Math is hard for me" with $\chi^2$- value 62.48 at 0.05 level showed that 24.40% of the students strongly disagreed and 40.07% of the students disagreed with this statement.

Similarly statement no. 7 "Getting a teacher to take me seriously in math is a problem" with $\chi^2$- value 60.16 at 0.05 level showed that 30.95% of the students strongly disagreed and 36.91% of the students disagreed with this statement.

Similarly statement no. 36 "I would expect a woman mathematician to be a forceful type of person" with $\chi^2$- value 44.69 at 0.05 level showed that 17.26% of the students strongly disagreed, 25.00% of the students disagreed and 35.71% of the students are neutral with this statement.

Similarly statement no. 32 "Most subjects I can handle ok, but I just can't do a good job with math" with $\chi^2$- value 60.16 at 0.05 level showed that 30.95% of the students strongly disagreed and 36.91% of the students disagreed with this statement. It means that a great majority of students were in the favour of all pupil can learn and handle mathematics easily.

Similarly statement nos.30,16,24,22 have the $\chi^2$-value39.17,36.89,35.71,33.5 respectively and the statement no.11 "when a woman has to solve a math problem, she should ask a man for help" is significant with the least $\chi^2$-value 15.64 at 0.05level. It was a negative statement and about52.97% of the students rejected this statement.

Hence from the analysis of the data, presented in Table no.1(ii) we can see the $\chi^2$-values from 342.42 to 15.64 i.e. all the statements have the $\chi^2$-value > 9.488, which proves that majority of the students are in the favour of positive attitude towards mathematics. Very low of them were not in favour with this subject.

## Comparison of the Attitude of Boys and Girls Towards Mathematics

The second objective of the study was to compare boy's and girls' attitude towards mathematics. In order to achieve this objective, the following hypotheses were formulated.

$H_0$: There is no significant difference between boys' and girls' attitude towards mathematics.

$H_0$: $\mu_1=\mu_2$(the mean score are same)

$H_1$: There is significance difference between boys' and girls' attitude towards mathematics.

$H_1$: $\mu_1 \neq \mu_2$(the mean scores are not same)

To verify this hypothesis, the attitude scores of 5,4,3,2,1 is provided for rating strongly agree, agree, undecided, disagree and strongly disagree. The attitude score of boys and girls are given in the table no.2(i) and 2(ii)

**Table no. 2(i)**

**No .of Responses and Attitudes Scores Obtained by Boys**

| S.N. | STATEMENTS | SA | A | N | D | SD | Total ($X_1$) | $X_1^2$ |
|---|---|---|---|---|---|---|---|---|
| 1 | I am sure that I can learn math. | 49 | 32 | 2 | 0 | 0 | 379 | 143641 |
| 2 | My teachers have been interested in my progress in math. | 33 | 40 | 11 | 0 | 0 | 358 | 128164 |
| 3 | Knowing mathematics will help me earn a living. | 45 | 27 | 9 | 2 | 0 | 364 | 132496 |
| 4 | I don't think I could do advanced math. | 1 | 12 | 9 | 36 | 25 | 321 | 103041 |
| 5 | Math will not be important to me in my life's work. | 0 | 4 | 5 | 28 | 47 | 370 | 136900 |
| 6 | Males are not naturally better than females in math. | 0 | 1 | 22 | 31 | 30 | 162 | 26244 |
| 7 | Getting a teacher to take me seriously in math is a problem. | 5 | 7 | 17 | 29 | 26 | 316 | 99856 |
| 8 | Math is hard for me. | 4 | 10 | 11 | 40 | 19 | 312 | 97344 |
| 9 | It's hard to believe a female could be a genius in mathematics. | 3 | 10 | 22 | 27 | 20 | 297 | 88209 |
| 10 | I'll need mathematics for my future work. | 45 | 30 | 7 | 2 | 0 | 370 | 136900 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 11 | When a woman has to solve a math problem, she should ask a man for help. | 12 | 15 | 26 | 27 | 10 | 278 | 77284 |
| 12 | I am sure of myself when I do math. | 20 | 47 | 9 | 6 | 1 | 328 | 107584 |
| 13 | I don’t expect to use much math when I get out of school. | 5 | 13 | 10 | 20 | 29 | 286 | 81796 |
| 14 | I would talk to my math teachers about a career that uses math. | 20 | 39 | 12 | 12 | 1 | 317 | 100489 |
| 15 | Women can do just as well as men in math. | 59 | 15 | 4 | 2 | 3 | 374 | 139876 |
| 16 | It's hard to get math teachers to respect me. | 7 | 14 | 15 | 34 | 13 | 281 | 78961 |
| 17 | Math is a worthwhile, necessary subject. | 64 | 15 | 3 | 0 | 2 | 391 | 152881 |
| 18 | I would have more faith in the answer for a math problem solved by a man than a woman. | 4 | 7 | 24 | 22 | 27 | 313 | 97969 |
| 19 | I'm not the type to do well in math. | 2 | 2 | 11 | 28 | 40 | 351 | 123201 |
| 20 | My teachers have encouraged me to study more math. | 50 | 28 | 4 | 0 | 2 | 376 | 141376 |
| 21 | Taking math is a waste of time. | 2 | 0 | 3 | 18 | 61 | 388 | 150544 |
| 22 | I have a hard time getting teachers to talk seriously with me about math. | 3 | 20 | 23 | 17 | 19 | 275 | 75625 |
| 23 | Math has been my worst subject. | 1 | 4 | 4 | 24 | 50 | 367 | 134689 |
| 24 | Women who enjoy studying math are a little strange. | 10 | 16 | 12 | 32 | 13 | 271 | 73441 |
| 25 | I think I could handle more difficult math. | 18 | 41 | 13 | 6 | 0 | 305 | 93025 |
| 26 | My teachers think advanced math will be a waste of time for me. | 1 | 6 | 9 | 33 | 35 | 347 | 120409 |
| 27 | I will use mathematics in many ways as an adult. | 23 | 43 | 12 | 4 | 1 | 332 | 110224 |
| 28 | Females are as good as males in geometry. | 30 | 39 | 10 | 2 | 2 | 342 | 116964 |
| 29 | I see mathematics as something I won't use very often when I get out of high school. | 2 | 8 | 5 | 41 | 28 | 337 | 113569 |
| 30 | I feel that math teachers ignore me when I try to talk about something serious. | 10 | 13 | 16 | 25 | 20 | 284 | 80656 |
| 31 | Women certainly are smart enough to do well in math. | 27 | 31 | 18 | 7 | 1 | 328 | 107584 |
| 32 | Most subjects I can handle OK, but I just can't do a good job with math. | 3 | 18 | 12 | 22 | 27 | 298 | 88804 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 33 | I can get good grades in math. | 24 | 41 | 15 | 2 | 2 | 335 | 112225 |
| 34 | I'll need a good understanding of math for my future work. | 51 | 26 | 6 | 1 | 0 | 379 | 143641 |
| 35 | My teachers want me to take all the math I can. | 48 | 24 | 7 | 3 | 2 | 365 | 133225 |
| 36 | I would expect a woman mathematician to be a forceful type of person. | 4 | 13 | 32 | 22 | 12 | 274 | 75076 |
| 37 | I know I can do well in math. | 36 | 38 | 8 | 1 | 1 | 359 | 128881 |
| 38 | Studying math is just as good for women as for men. | 57 | 21 | 1 | 0 | 3 | 375 | 140625 |
| 39 | Doing well in math is not important for my future. | 3 | 2 | 7 | 21 | 51 | 367 | 134689 |
| 40 | My teachers would not take me seriously if I told them I was interested in a career in science and mathematics. | 5 | 8 | 14 | 15 | 42 | 333 | 110889 |
| 41 | I am sure I could do advanced work in math. | 13 | 39 | 26 | 5 | 0 | 309 | 95481 |
| 42 | Math is not important for my life. | 1 | 0 | 5 | 21 | 57 | 385 | 148225 |
| 43 | I'm no good in math. | 1 | 7 | 14 | 32 | 29 | 330 | 108900 |
| 44 | I study math because I know how useful it is. | 49 | 28 | 5 | 1 | 1 | 375 | 140625 |
| 45 | Math teachers have made me feel I have the ability to go on in mathematics. | 22 | 42 | 14 | 2 | 2 | 326 | 106276 |
| 46 | I would trust a female just as much as I would trust a male to solve important math problems. | 42 | 34 | 6 | 1 | 1 | 367 | 134689 |
| 47 | My teachers think I'm the kind of person who could do well in math. | 22 | 40 | 16 | 5 | 1 | 329 | 108241 |
| 48 | I feel boring in the class of female mathematics teacher. | 1 | 3 | 12 | 19 | 49 | 364 | 132496 |
| | | | | | | | 15990 | 5413930 |

Here, $\sum X_1^2 = 5413930$

$\sum X_1 = 15990$ no. of questions $N_1 = 48$, so mean $(\overline{X_1}) = \frac{15990}{48} = 333.13$

And S.D. $(S_1) = \sqrt{\frac{\sum X_1^2}{N_1} - \left(\frac{\sum X_1}{N_1}\right)^2} = \sqrt{\frac{5413930}{48} - \left(\frac{15990}{48}\right)^2} = 42.64$

**Table no. 2(ii)**

**No.of Responses and Attitudes Scores Obtained by Girls**

| S.N. | STATEMENT | SA | A | N | D | SD | Total (X) | $X^2$ |
|---|---|---|---|---|---|---|---|---|
| 1 | I am sure that I can learn math. | 48 | 33 | 0 | 1 | 0 | 374 | 139876 |
| 2 | My teachers have been interested in my progress in math. | 41 | 33 | 9 | 1 | 0 | 366 | 133956 |
| 3 | Knowing mathematics will help me earn a living. | 44 | 33 | 5 | 2 | 0 | 371 | 137641 |
| 4 | I don't think I could do advanced math. | 1 | 10 | 12 | 34 | 26 | 323 | 104329 |
| 5 | Math will not be important to me in my life's work. | 0 | 1 | 3 | 26 | 54 | 385 | 148225 |
| 6 | Males are not naturally better than females in math. | 2 | 5 | 23 | 34 | 20 | 187 | 34969 |
| 7 | Getting a teacher to take me seriously in math is a problem. | 4 | 12 | 9 | 33 | 26 | 317 | 100489 |
| 8 | Math is hard for me. | 5 | 15 | 12 | 29 | 22 | 297 | 88209 |
| 9 | It's hard to believe a female could be a genius in mathematics. | 4 | 5 | 5 | 19 | 51 | 360 | 129600 |
| 10 | I'll need mathematics for my future work. | 45 | 33 | 3 | 2 | 1 | 371 | 137641 |
| 11 | When a woman has to solve a math problem, she should ask a man for help. | 8 | 14 | 9 | 24 | 29 | 304 | 92416 |
| 12 | I am sure of myself when I do math. | 20 | 42 | 17 | 1 | 3 | 324 | 104976 |
| 13 | I don't expect to use much math when I get out of school. | 4 | 9 | 11 | 42 | 18 | 313 | 97969 |
| 14 | I would talk to my math teachers about a career that uses math. | 26 | 45 | 5 | 6 | 1 | 338 | 114244 |
| 15 | Women can do just as well as men in math. | 69 | 10 | 0 | 1 | 4 | 391 | 152881 |
| 16 | It's hard to get math teachers to respect me. | 5 | 17 | 11 | 26 | 24 | 296 | 87616 |
| 17 | Math is a worthwhile, necessary subject. | 60 | 20 | 0 | 0 | 4 | 384 | 147456 |
| 18 | I would have more faith in the answer for a math problem solved by a man than a woman. | 3 | 6 | 12 | 23 | 40 | 343 | 117649 |
| 19 | I'm not the type to do well in math. | 4 | 0 | 6 | 33 | 41 | 359 | 128881 |
| 20 | My teachers have encouraged me to study more math. | 46 | 31 | 5 | 0 | 2 | 371 | 137641 |
| 21 | Taking math is a waste of time. | 0 | 0 | 6 | 11 | 66 | 392 | 153664 |
| 22 | I have a hard time getting teachers to talk seriously with me about math. | 3 | 12 | 25 | 29 | 15 | 293 | 85849 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 23 | Math has been my worst subject. | 2 | 3 | 3 | 28 | 47 | 364 | 132496 |
| 24 | Women who enjoy studying math are a little strange. | 4 | 11 | 10 | 23 | 34 | 318 | 101124 |
| 25 | I think I could handle more difficult math. | 19 | 38 | 13 | 11 | 2 | 310 | 96100 |
| 26 | My teachers think advanced math will be a waste of time for me. | 1 | 0 | 7 | 32 | 42 | 360 | 129600 |
| 27 | I will use mathematics in many ways as an adult. | 18 | 46 | 13 | 4 | 1 | 322 | 103684 |
| 28 | Females are as good as males in geometry. | 48 | 29 | 3 | 1 | 3 | 370 | 136900 |
| 29 | I see mathematics as something I won't use very often when I get out of high school. | 2 | 6 | 10 | 38 | 27 | 331 | 109561 |
| 30 | I feel that math teachers ignore me when I try to talk about something serious. | 4 | 10 | 7 | 32 | 30 | 323 | 104329 |
| 31 | Women certainly are smart enough to do well in math. | 52 | 26 | 2 | 0 | 3 | 373 | 139129 |
| 32 | Most subjects I can handle OK, but I just can't do a good job with math. | 8 | 16 | 6 | 29 | 24 | 294 | 86436 |
| 33 | I can get good grades in math. | 22 | 48 | 9 | 0 | 3 | 332 | 110224 |
| 34 | I'll need a good understanding of math for my future work. | 50 | 26 | 4 | 2 | 2 | 372 | 138384 |
| 35 | My teachers want me to take all the math I can. | 36 | 36 | 5 | 5 | 2 | 351 | 123201 |
| 36 | I would expect a woman mathematician to be a forceful type of person. | 4 | 13 | 28 | 20 | 17 | 279 | 77841 |
| 37 | I know I can do well in math. | 35 | 41 | 4 | 1 | 3 | 356 | 126736 |
| 38 | Studying math is just as good for women as for men. | 60 | 22 | 1 | 0 | 1 | 392 | 153664 |
| 39 | Doing well in math is not important for my future. | 0 | 0 | 6 | 23 | 54 | 380 | 144400 |
| 40 | My teachers would not take me seriously if I told them I was interested in a career in science and mathematics. | 4 | 4 | 9 | 19 | 48 | 355 | 126025 |
| 41 | I am sure I could do advanced work in math. | 11 | 45 | 17 | 9 | 2 | 306 | 93636 |
| 42 | Math is not important for my life. | 0 | 1 | 3 | 23 | 57 | 388 | 150544 |
| 43 | I'm no good in math. | 1 | 6 | 10 | 40 | 24 | 323 | 104329 |
| 44 | I study math because I know how useful it is. | 43 | 34 | 3 | 1 | 2 | 364 | 132496 |
| 45 | Math teachers have made me feel I have the ability to go on in mathematics. | 25 | 46 | 8 | 6 | 0 | 345 | 119025 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 46 | I would trust a female just as much as I would trust a male to solve important math problems. | 53 | 27 | 2 | 2 | 0 | 383 | 146689 |
| 47 | My teachers think I'm the kind of person who could do well in math. | 25 | 47 | 11 | 1 | 0 | 348 | 121104 |
| 48 | I feel boring in the class of female mathematics teacher. | 0 | 2 | 3 | 21 | 58 | 387 | 149769 |
| | | | | | | | 16485 | 5733603 |

Here $\sum X_2^2 = 5733603$

$\sum X_2 = 16485$ no. of questions $N_2 = 48$, so mean $(\overline{X_2}) = \frac{16485}{48} = 343.44$

And S.D.$(S_2) = \sqrt{\frac{\sum X_2^2}{N_2} - \left(\frac{\sum X_2}{N_2}\right)^2} = \sqrt{\frac{5733603}{48} - \left(\frac{16485}{48}\right)^2} = 38.74$

The mean attitude score of boys are compared to those of girls by using z- test. The computation is as follows:

$$z = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}} = \frac{333.13 - 343.44}{\sqrt{\frac{42.64^2}{84} + \frac{38.74^2}{84}}} = \frac{-10.39}{\sqrt{21.64+17.87}} = \frac{-10.39}{\sqrt{39.51}} = \frac{-10.39}{6.29} = -1.653$$

Also the calculated values of mean, standard deviation of boys and girls attitude towards mathematics and z-test are given in table no.3

**Table no. 3**

**Comparison of Boys and Girls Attitude towards mathematics**

| Group compared | Sample size(N) | Mean | S.D. | d.f. | z-value | conclusion |
|---|---|---|---|---|---|---|
| Boys | $N_1 = 84$ | 333.13 | 42.64 | 166 | -1.653 | $-1.96 < z < 1.96$ Null hypothesis is accepted |
| Girls | $N_2 = 84$ | 343.44 | 38.74 | | | |

Where $N_1$= No.of boys, $N_2$= No.of girls

S.D. = Standard deviation d.f. = degree of freedom i.e. $N_1+N_2-2 = 166$

Since the calculated value is greater than the tabulated value $t_{0.05,166} = -1.96$ i.e. $-1.653 > -1.96$, the null hypothesis is accepted.

The analysis of the information mentioned in the above table 3 represents that there were 84 boys and 84 girls students. The mean attitude scores of boys were 333.13 and their standard deviation was 42.64. Similarly, the mean attitude scores of girls were 343.44 and their standard deviation was 38.74. The calculated 'z-value' with respect to mean attitude difference of given magnitude was -1.653, which is greater than tabulated 'z-value'. So, the null hypothesis $H_0$ was accepted and alternative hypothesis was rejected. Therefore, the hypothesis that there is no significant difference between boys' and girls' attitude towards mathematics is true. Thus, it is concluded that there is no significant difference between boys' and girls' attitude towards mathematics is not necessarily false.

## Comparison of the Attitudes of Urban Students and Rural Students Towards Mathematics.

The third objective of this study is to compare the urban students' and rural students' attitude towards mathematics. "There is no significant difference between attitude of urban and rural students towards mathematics" was the formulated hypothesis for this objective.

To verify this hypothesis, the attitude scores of urban students and rural students are given below in the table 4(i) and 4(ii)

**Table no. 4 (i)**

**No. of Responses and Attitude Scores Obtained by Urban students**

| S.N. | STATEMENTS | SA | A | N | D | SD | (Y) | $Y^2$ |
|---|---|---|---|---|---|---|---|---|
| 1 | I am sure that I can learn math. | 53 | 29 | 0 | 0 | 0 | 381 | 145161 |
| 2 | My teachers have been interested in my progress in math. | 40 | 30 | 13 | 1 | 0 | 361 | 130321 |
| 3 | Knowing mathematics will help me earn a living. | 43 | 29 | 8 | 3 | 0 | 361 | 130321 |
| 4 | I don’t think I could do advanced math. | 1 | 10 | 8 | 34 | 29 | 326 | 106276 |
| 5 | Math will not be important to me in my life’s work. | 0 | 3 | 3 | 23 | 55 | 382 | 145924 |
| 6 | Males are not naturally better than females in math. | 1 | 4 | 20 | 36 | 23 | 176 | 30976 |
| 7 | Getting a teacher to take me seriously in math is a problem. | 5 | 6 | 8 | 37 | 28 | 329 | 108241 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 8 | Math is hard for me. | 5 | 8 | 6 | 39 | 28 | 335 | 112225 |
| 9 | It’s hard to believe a female could be a genius in mathematics. | 6 | 6 | 18 | 18 | 36 | 324 | 104976 |
| 10 | I’ll need mathematics for my future work. | 41 | 35 | 4 | 3 | 0 | 363 | 131769 |
| 11 | When a woman has to solve a math problem, she should ask a man for help. | 15 | 17 | 8 | 23 | 20 | 265 | 70225 |
| 12 | I am sure of myself when I do math. | 29 | 41 | 8 | 1 | 3 | 338 | 114244 |
| 13 | I don’t expect to use much math when I get out of school. | 3 | 11 | 8 | 34 | 27 | 320 | 102400 |
| 14 | I would talk to my math teachers about a career that uses math. | 19 | 50 | 7 | 6 | 1 | 329 | 108241 |
| 15 | Women can do just as well as men in math. | 67 | 11 | 2 | 2 | 2 | 391 | 152881 |
| 16 | It's hard to get math teachers to respect me. | 6 | 12 | 9 | 35 | 22 | 307 | 94249 |
| 17 | Math is a worthwhile, necessary subject. | 68 | 12 | 1 | 0 | 3 | 394 | 155236 |
| 18 | I would have more faith in the answer for a math problem solved by a man than a woman. | 5 | 9 | 18 | 15 | 37 | 322 | 103684 |
| 19 | I'm not the type to do well in math. | 1 | 0 | 7 | 25 | 50 | 372 | 138384 |
| 20 | My teachers have encouraged me to study more math. | 55 | 25 | 2 | 0 | 2 | 383 | 146689 |
| 21 | Taking math is a waste of time. | 1 | 0 | 4 | 9 | 69 | 394 | 155236 |
| 22 | I have a hard time getting teachers to talk seriously with me about math. | 4 | 12 | 23 | 24 | 20 | 293 | 85849 |
| 23 | Math has been my worst subject. | 2 | 0 | 2 | 20 | 58 | 378 | 142884 |
| 24 | Women who enjoy studying math are a little strange. | 9 | 10 | 7 | 32 | 25 | 303 | 91809 |
| 25 | I think I could handle more difficult math. | 20 | 42 | 13 | 3 | 2 | 315 | 99225 |
| 26 | My teachers think advanced math will be a waste of time for me. | 1 | 2 | 4 | 29 | 47 | 368 | 135424 |
| 27 | I will use mathematics in many ways as an adult. | 18 | 52 | 12 | 1 | 1 | 337 | 113569 |
| 28 | Females are as good as males in geometry. | 40 | 34 | 6 | 2 | 2 | 360 | 129600 |
| 29 | I see mathematics as something I won't use very often when I get out of high school. | 3 | 4 | 8 | 42 | 27 | 338 | 114244 |
| 30 | I feel that math teachers ignore me when I try to talk about something serious. | 9 | 4 | 12 | 31 | 27 | 312 | 97344 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 31 | Women certainly are smart enough to do well in math. | 42 | 32 | 8 | 1 | 1 | 365 | 133225 |
| 32 | Most subjects I can handle OK, but I just can't do a good job with math. | 8 | 17 | 2 | 20 | 35 | 303 | 91809 |
| 33 | I can get good grades in math. | 31 | 41 | 9 | 1 | 2 | 350 | 122500 |
| 34 | I'll need a good understanding of math for my future work. | 57 | 21 | 2 | 3 | 1 | 382 | 145924 |
| 35 | My teachers want me to take all the math I can. | 46 | 28 | 6 | 2 | 2 | 366 | 133956 |
| 36 | I would expect a woman mathematician to be a forceful type of person. | 6 | 13 | 34 | 18 | 11 | 261 | 68121 |
| 37 | I know I can do well in math. | 44 | 33 | 3 | 1 | 3 | 366 | 133956 |
| 38 | Studying math is just as good for women as for men. | 64 | 16 | 1 | 0 | 3 | 390 | 152100 |
| 39 | Doing well in math is not important for my future. | 1 | 0 | 5 | 20 | 57 | 381 | 145161 |
| 40 | My teachers would not take me seriously if I told them I was interested in a career in science and mathematics. | 1 | 3 | 13 | 15 | 52 | 366 | 133956 |
| 41 | I am sure I could do advanced work in math. | 12 | 46 | 15 | 9 | 1 | 308 | 94864 |
| 42 | Math is not important for my life. | 0 | 1 | 2 | 19 | 62 | 394 | 155236 |
| 43 | I'm no good in math. | 1 | 9 | 7 | 33 | 32 | 332 | 110224 |
| 44 | I study math because I know how useful it is. | 48 | 28 | 3 | 2 | 2 | 367 | 134689 |
| 45 | Math teachers have made me feel I have the ability to go on in mathematics. | 26 | 44 | 9 | 4 | 1 | 342 | 116964 |
| 46 | I would trust a female just as much as I would trust a male to solve important math problems. | 47 | 31 | 4 | 1 | 1 | 374 | 139876 |
| 47 | My teachers think I'm the kind of person who could do well in math. | 28 | 44 | 10 | 2 | 0 | 350 | 122500 |
| 48 | I feel boring in the class of female mathematics teacher. | 0 | 2 | 6 | 17 | 59 | 385 | 148225 |
| | | | | | | | 16539 | 5780893 |

Here $\sum Y_1^2 = 5409418$

$\sum Y_1 = 15984$ no. of questions $N_1 = 48$, so mean $(\bar{Y}_1) = \frac{16539}{48} = 344.56$

And S.D.($S_1$)= $\sqrt{\frac{\sum Y_1^2}{N_1} - \left(\frac{\sum Y_1}{N_1}\right)^2} = \sqrt{\frac{5780893}{48} - \left(\frac{16539}{48}\right)^2}$ =41.38

**Table no.4 (ii)**

**No.of Responses and Attitude Score Obtained by Rural Students**

| S.N. | STATEMENTS | SA | A | N | D | SD | Total ($Y_2$) | $Y_2^2$ |
|---|---|---|---|---|---|---|---|---|
| 1 | I am sure that I can learn math. | 44 | 36 | 2 | 1 | 0 | 372 | 138384 |
| 2 | My teachers have been interested in my progress in math. | 34 | 43 | 7 | 0 | 0 | 363 | 131769 |
| 3 | Knowing mathematics will help me earn a living. | 46 | 31 | 6 | 1 | 0 | 374 | 139876 |
| 4 | I don't think I could do advanced math. | 1 | 12 | 13 | 36 | 22 | 318 | 101124 |
| 5 | Math will not be important to me in my life's work. | 0 | 2 | 5 | 31 | 46 | 373 | 139129 |
| 6 | Males are not naturally better than females in math. | 1 | 2 | 25 | 29 | 27 | 173 | 29929 |
| 7 | Getting a teacher to take me seriously in math is a problem. | 4 | 13 | 18 | 25 | 24 | 304 | 92416 |
| 8 | Math is hard for me. | 4 | 17 | 17 | 30 | 15 | 284 | 80656 |
| 9 | It's hard to believe a female could be a genius in mathematics. | 1 | 9 | 9 | 28 | 35 | 333 | 110889 |
| 10 | I'll need mathematics for my future work. | 49 | 28 | 6 | 1 | 0 | 377 | 142129 |
| 11 | When a woman has to solve a math problem, she should ask a man for help. | 5 | 12 | 21 | 27 | 19 | 295 | 87025 |
| 12 | I am sure of myself when I do math. | 11 | 48 | 18 | 6 | 1 | 314 | 98596 |
| 13 | I don't expect to use much math when I get out of school. | 6 | 11 | 13 | 34 | 20 | 303 | 91809 |
| 14 | I would talk to my math teachers about a career that uses math. | 27 | 34 | 10 | 12 | 1 | 326 | 106276 |
| 15 | Women can do just as well as men in math. | 61 | 14 | 2 | 1 | 5 | 374 | 139876 |
| 16 | It's hard to get math teachers to respect me. | 6 | 19 | 17 | 25 | 15 | 270 | 72900 |
| 17 | Math is a worthwhile, necessary subject. | 56 | 23 | 2 | 0 | 3 | 381 | 145161 |
| 18 | I would have more faith in the answer for a math problem solved by a man than a woman. | 2 | 4 | 18 | 30 | 30 | 334 | 111556 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 19 | I'm not the type to do well in math. | 5 | 2 | 10 | 36 | 31 | 338 | 114244 |
| 20 | My teachers have encouraged me to study more math. | 41 | 34 | 7 | 0 | 2 | 364 | 132496 |
| 21 | Taking math is a waste of time. | 1 | 0 | 5 | 20 | 58 | 386 | 148996 |
| 22 | I have a hard time getting teachers to talk seriously with me about math. | 2 | 20 | 25 | 22 | 14 | 275 | 75625 |
| 23 | Math has been my worst subject. | 1 | 7 | 5 | 32 | 39 | 353 | 124609 |
| 24 | Women who enjoy studying math are a little strange. | 5 | 17 | 15 | 23 | 22 | 286 | 81796 |
| 25 | I think I could handle more difficult math. | 17 | 37 | 13 | 14 | 0 | 300 | 90000 |
| 26 | My teachers think advanced math will be a waste of time for me. | 1 | 4 | 12 | 36 | 30 | 339 | 114921 |
| 27 | I will use mathematics in many ways as an adult. | 23 | 37 | 13 | 7 | 1 | 317 | 100489 |
| 28 | Females are as good as males in geometry. | 38 | 34 | 7 | 1 | 3 | 352 | 123904 |
| 29 | I see mathematics as something I won't use very often when I get out of high school. | 1 | 10 | 7 | 37 | 28 | 330 | 108900 |
| 30 | I feel that math teachers ignore me when I try to talk about something serious. | 5 | 19 | 11 | 26 | 23 | 295 | 87025 |
| 31 | Women certainly are smart enough to do well in math. | 37 | 25 | 12 | 6 | 3 | 336 | 112896 |
| 32 | Most subjects I can handle OK, but I just can't do a good job with math. | 3 | 17 | 16 | 31 | 16 | 209 | 43681 |
| 33 | I can get good grades in math. | 15 | 48 | 15 | 1 | 3 | 317 | 100489 |
| 34 | I'll need a good understanding of math for my future work. | 44 | 31 | 8 | 0 | 1 | 369 | 136161 |
| 35 | My teachers want me to take all the math I can. | 38 | 32 | 6 | 6 | 2 | 350 | 122500 |
| 36 | I would expect a woman mathematician to be a forceful type of person. | 2 | 13 | 26 | 24 | 18 | 298 | 88804 |
| 37 | I know I can do well in math. | 27 | 46 | 9 | 1 | 1 | 349 | 121801 |
| 38 | Studying math is just as good for women as for men. | 53 | 27 | 1 | 0 | 1 | 377 | 142129 |
| 39 | Doing well in math is not important for my future. | 2 | 2 | 8 | 24 | 48 | 366 | 133956 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 40 | My teachers would not take me seriously if I told them I was interested in a career in science and mathematics. | 8 | 9 | 10 | 19 | 38 | 322 | 103684 |
| 41 | I am sure I could do advanced work in math. | 12 | 38 | 28 | 5 | 1 | 307 | 94249 |
| 42 | Math is not important for my life. | 1 | 0 | 6 | 25 | 52 | 379 | 143641 |
| 43 | I'm no good in math. | 1 | 4 | 17 | 39 | 21 | 321 | 103041 |
| 44 | I study math because I know how useful it is. | 44 | 34 | 5 | 0 | 1 | 372 | 138384 |
| 45 | Math teachers have made me feel I have the ability to go on in mathematics. | 20 | 44 | 13 | 4 | 1 | 324 | 104976 |
| 46 | I would trust a female just as much as I would trust a male to solve important math problems. | 48 | 30 | 4 | 2 | 0 | 376 | 141376 |
| 47 | My teachers think I'm the kind of person who could do well in math. | 19 | 43 | 17 | 4 | 1 | 327 | 106929 |
| 48 | I feel boring in the class of female mathematics teacher. | 1 | 3 | 9 | 22 | 47 | 357 | 127449 |
| | | | | | | | 15859 | 5328651 |

Here, $\sum Y_2^2 = 5328651$

$\sum Y_2 = 15859$ no. of questions $N_2 = 48$, so mean $(\overline{Y_2}) = \frac{15859}{48} = 330.39$

And S.D.$(S_2) = \sqrt{\frac{\sum Y_2^2}{N_2} - \left(\frac{\sum Y_2}{N_2}\right)^2} = \sqrt{\frac{5328651}{48} - \left(\frac{15859}{48}\right)^2} = 43.03$

The mean attitude score of urban students are compared to those of rural students by using t-test. The computation is as follows:

$$z = \frac{\overline{Y_1} - \overline{Y_2}}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}} = \frac{344.56 - 330.39}{\sqrt{\frac{41.38^2}{84} + \frac{43.03^2}{84}}} = \frac{14.17}{\sqrt{20.38+22.04}} = \frac{14.17}{\sqrt{42.42}} = \frac{14.17}{6.51} = 2.176$$

Also the calculated values of mean, standard deviation of attitude urban students and rural students towards mathematics and 'z-test' are given in the table 5.

**Table no. 5**

**Comparison of Urban and Rural Students' Attitude towards Mathematics**

| Group compared | Sample size(N) | Mean | S.D. | d.f. | z-value | conclusion |
|---|---|---|---|---|---|---|
| Urban students | $N_1$= 84 | 344.56 | 41.38 | 166 | 2.176 | >1.96 Null hypothesis is rejected |
| Rural students | $N_2$=84 | 330.39 | 43.03 | | | |

Where $N_1$= No.of Urban students

$N_2$= No.of Rural students

S.D. = Standard deviation

d.f. = degree of freedom i.e. $N_1+N_2-2$= 166

Since the calculated value is greater than the tabulated value $t_{0.05,166}$ = 1.96 i.e. 2.176> 1.96, the null hypothesis is rejected.

The analysis of the information mentioned in the above table 5 represents that there were 84 urban students and 84 rural students. The mean attitude scores of urban students was 344.56 and their standard deviation was 41.38. Similarly, the mean attitude scores of rural students was 330.39 and their standard deviation was 43.03. The calculated t-value with respect to mean attitude difference of given magnitude was 2.176, which is greater than tabulated t-value. So, the null hypothesis $H_0$ was rejected and alternative hypothesis was accepted. Therefore, the hypothesis that there is no significant difference between boys' and girls' attitude towards mathematics is false. Thus, it is concluded that the mean attitude scores of urban students is significantly different than that of rural students.

# Chapter –V

## SUMMARY, FINDINGS, CONCLUSION AND RECOMMENDATION

After having analysis and interpretation of collected data, collected as per the design of the study, in this concluding chapter, an attempt has been made to derive conclusions. The first section of this chapter presents summary with findings, second section presents the major finding of the study and the third session presents conclusion that is derived from the second section. Finally, the last section presents recommendations for the further study.

### Summary

The researcher has studied the attitude of students of different schools. The study was survey type. The population of the study consisted of all the students of secondary level of Tanahun district. From this sample, 184 students were selected from fourteen schools.

For the achievement of the objectives of chapter I, the researcher collected a set of opinionnaire prepared by Fennma-Sherman which consists of forty eight statements consisting four domains: personal confidence about mathematics, usefulness of mathematics, mathematics is perceived as male domain and perception of teacher's attitude. In each domain, six are positive and six are negative attitude. Likert's five points scale was adopted with the value 5,4,3,2 and 1 assigned for strongly agree, agree, neutral, disagree and strongly disagree respectively in each positive statements and 1,2,3,4 and 5 for negative statement.

To obtain the objectives of the study following statistical tool have been applied:

(i) '$\chi^2$ test' was used to find the significance of the opinion of secondary level students towards mathematics.

(ii) 'z-test' was used to test the significant difference between mean attitude scores of boys and girls. Similarly, the significant difference between the attitude scores of urban students and mean attitude scores of rural students was tested by using 'z-test'.

(iii) All the tests were tested at 0.05 level of significance.

## Findings

Statistical analysis of the collected data yields the following results as finding of the study.

1. The $\chi^2$-value of the all 48 statements is from 342.42 to 15.64 at the 0.05 level of significance which are greater than 9.488.So the secondary level students had positive attitude towards mathematics.
2. The average score and standard deviation of boys and girls attitude toward mathematics are 333.13, 343.44 and 42.64, 38.74 respectively. The z-value is

   -1.653 which is greater than tabulated value. So the secondary level boys and girls had similar attitude towards mathematics.
3. The average score and standard deviation of urban and rural student's attitude toward mathematics are 344.56, 330.39 and 41.38, 43.03 respectively. The z- value is 2.176 which is greater than the tabulated value 1.96. So the mean attitude scores of urban students are significantly different than that of rural students towards mathematics.

## Conclusion

On the basis of findings some very significant conclusions can be drawn about the attitude of secondary level students towards mathematics. The conclusions are as follows:

1. There is a positive attitude of secondary level students towards mathematics.
2. There is no gender wise difference in attitude among the students towards mathematics of secondary level.
3. The urban students have significantly different attitude than rural students towards mathematics.
4. Both boys and girls have positive attitude towards mathematics.

## Recommendations

Due to the delimitations of this study, the result may not be generalized for all areas and all level. On the basis of these findings, the researcher would like to suggest some recommendations:

1. To establish the findings, similar study should be carried out regional and national level.
2. It should be studied why most of the students cannot get success even though they devote much time in mathematics in secondary level.
3. It is also recommended to study why most of the students of government school hesitate to study mathematics as subject.
4. Although most of the students' have positive attitude towards mathematics but why there are very few students study mathematics in higher level? Also recommended to study further.

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## Appendix A:

## The Questionnaire for the Data Collection

Kof/f ljBfyL{ efO{ jlxgLx? d}n] "A STUDY ON ATTITUDE OF SECONDARY LEVEL STUDENTS TOWARD MATHEMATICS IN TANAHUN DISTRICT" eGg] zLif{sdf Pp6f n3'cg';Gwfg sfo{ ug{ nfu]sf] 5'. o;sf nflu oxf $* j6f sygx? 5g\. pQm sygx?sf] 7Ls jf j]7Ls pQ/ x'b}gg\. Tof] t ltdLx?sf] wf/0ff / cg'ejdf cfwfl/t x'G5. k|To]s sygsf] % j6f ;DefJo ljsNkx?M k"0f{ ;xdt, ;xdt, clglZrt, c;xdt, k"0f{ c;xdt lgwf{/0f ul/Psf 5g\.To;}n] sygx? ;fjwfgL k"j{s cWoog u/L k"0f{ ;xdt eP klxnf] sf]7fdf, ;xdt eP bf];|f] sf]7fdf, clglZrt eP t];|f] sf]7fdf, c;xdt eP rf}yf] sf]7fdf / k"0f{ c;xdt eP kfFrf} sf]7fdf -√_ lrGx nufpg'xf];\.

## ljBfyL{ ;DjGwL ;fdfGo hfgsf/L

!=ljBfyL{sf]
gfdM==========

@=ljBfnosf]gfd /
7]ufgfM==========

#= sIff M========== $= ;]S;gM========== %= /f]Ng+========== ^= ln+u M s]6f- _÷s]6L - _

&= P]lR5s ul0ft M lnPsf] - _÷ glnPsf] - _

| S. N. | STATEMENTS | S A | A | N | D | S D |
|---|---|---|---|---|---|---|
| 1. | I am sure that I can learn math. -d ljZj:t 5' sL d ul0ft k9\g ÷ l;Sg ;S5'. _ | | | | | |
| 2. | My teachers have been interested in my progress in math<br>-d]/f u'?x? ul0ftdf d]/f] k\|ult k\|lt rf;f] lng' ePsf] 5._ | | | | | |
| 3. | Knowing mathematics will help me earn a living.<br>-ul0ft hfGgfn] d]/f] lhjgdf sdfO ug{ ;xof]u u5{_ | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 4. | I don't think I could do advanced math. -d}n] pRr txsf] ul0ft k9\g ;S5' h:tf] nfUb}g_ | | | | | |
| 5. | Math will not be important to me in my life's work. -d]/f] lhjgdf d]/f nflu ul0ft dxTjk'0f{ x'g] 5}g ._ | | | | | |
| 6. | Males are not naturally better than females in math. -k'?ifx? :jefj}n] ul0ft k9\g dlxnfx? eGbf l;kfn' x'b}gg\ ._ | | | | | |
| 7. | Getting a teacher to take me seriously in math is a problem. -d]/f nflu ul0ftnfO{ ulDe/ ?kdf lng] lzIfs kfpg ;d:ofsf] ljifo jg]sf] 5 ._ | | | | | |
| 8. | Math is hard for me. -d]/f nflu ul0ft sl7g ljifo xf] ._ | | | | | |
| 9. | It's hard to believe a female could be a genius in mathematics. -dlxnfx? ul0ftdf kf]Vt x'g ;S5g\ eGg] s'/fdf ljZjf; ug{ ufx\|f] 5_ | | | | | |
| 10. | I'll need mathematics for my future work. -eljiodf sfd ug{sf nflu dnfO{ ul0ft cfjZos k5{ ._ | | | | | |
| 11. | When a woman has to solve a math problem, she should ask a man for help. -ul0ftsf s'g} ;d:of ;dfwfg ug{ dlxnfn] k'?ifsf] ;xof]u lng' k5{ ._ | | | | | |
| 12. | I am sure of myself when I do math. -ul0ftsf ;d:ofx? ;dfwfg ug{ ;S5' eGg] s'/fdf d ljZj:t 5' ._ | | | | | |
| 13. | I don't expect to use much math when I get out of school. -hj d ljBfnojf6 jflx/ lg:sG5' ul0ftsf] vf;} k\|of]u x'b}g ._ | | | | | |
| 14. | I would talk to my math teachers about a career that uses math. -ul0ftsf pkof]lutfsf jf/]df d]/f ul0ft | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | lzIfs;+u s'/f ug]{ ub{5' ._ | | | | | |
| 15. | Women can do just as well as men in math. -dlxnfn] klg k'?ifn] hlQs} ul0ft l;Sg ;S5g ._ | | | | | |
| 16. | It's hard to get math teachers to respect me. -ul0ft lzIfsjf6 ;Ddfg kfpg' d]/f nflu d'l:snsf] ljifo xf] ._ | | | | | |
| 17. | Math is a worthwhile, necessary subject. -ul0ft cTofjZos / dxTjk"0f{ ljifo xf] ._ | | | | | |
| 18. | I would have more faith in the answer for a math problem solved by a man than a woman. -dnfO{ dlxnfn] ;dfwfg u/]sf] ul0ftLo ;d:ofdf eGbf k'?ifn] ;dfwfg u/]sf ;dfwfgx?df ljZjf; nfUb5 ._ | | | | | |
| 19. | I'm not the type to do well in math. -d ul0ftdf /fd\|f] ug{ ;Sg] vfnsf] dfG5] xf]Og ._ | | | | | |
| 20. | My teachers have encouraged me to study more math. -d]/f u'?x?n] ul0ft l;Sg k\|f]T;fxg ug'{x'G5 ._ | | | | | |
| 21. | Taking math is a waste of time. -ul0ft ljifo lnP/ k9\g' ;dosf] ajf{lb dfq xf] ._ | | | | | |
| 22. | I have a hard time getting teachers to talk seriously with me about math. -d]/f nflu ul0ftnfO{ ulDe/ ?kdf lng] lzIfssf] ;do kfpg' d'lZsnsf] ljifo xf] ._ | | | | | |
| 23. | Math has been my worst subject. -d]/f nflu ul0ft ;j}eGbf vQd ljifo ePsf] 5 ._ | | | | | |
| 24. | Women who enjoy studying math are a little strange. -ul0ft cWoog u/]/ cfgGb lng] dlxnfx?nfO{ crDd dfGg' k5{ ._ | | | | | |
| 25. | I think I could handle more difficult math. -dnfO{ nfU5 sL d cem} s7Lg ul0ft klg cWoog ug{ ;S5' ._ | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 26. | My teachers think advanced math will be a waste of time for me.<br>-d]/f ul0ft lzIfsn] dfGg' x'G5 ls d}n] hl6n ul0ft k9\g' ;dosf] ajf{bL dfq xf] ._ | | | | | |
| 27. | I will use mathematics in many ways as an adult.<br>-jo:sx?n] em} d klg ul0ftnfO{ ljleGg tl/sfn] k\|of]u ug]{ 5' ._ | | | | | |
| 28. | Females are as good as males in geometry. -dlxnfx? klg k'?ifx? em} HofldtLdf kf]Vt x'G5g\ ._ | | | | | |
| 29. | I see mathematics as something I won't use very often when I get out of high school. -d}n] b]lv/x]sf] 5' sL d dfWolds tx kf/ u/]kl5 d}n] ul0ftsf] vf;} k\|of]u ulb{g ._ | | | | | |
| 30. | I feel that math teachers ignore me when I try to talk about something serious.<br>-hj d ul0ft lzIfs;+u Wofg k'j{s s]xL s'/fx? ug{ vf]H5' dnfO{ j]jf:tf u/]sf] dxz'; x'G5 ._ | | | | | |
| 31. | Women certainly are smart enough to do well in math.<br>-dlxnfx? cjZog} ul0ftdf /fd\|f] ug{ ;lfd x'G5g\ ._ | | | | | |
| 32. | Most subjects I can handle OK, but I just can't do a good job with math.<br>-;j} h;f] ljifodf d}n] /fd\|f] ug{ ;S5' t/ ul0ftdf dfq d}n] /fd\|f] ug{ ;lSbg ._ | | | | | |
| 33. | I can get good grades in math. -d}n] ul0ftdf /fd\|f] c+s k\|fKt ug{ ;S5' ._ | | | | | |
| 34. | I'll need a good understanding of math for my future work.<br>-d]/f] eljiosf] sfdsf] nflu ul0ftdf /fd\|f] j'emfOsf] cfjZostf kb{5 ._ | | | | | |
| 35. | My teachers want me to take all the math I can.<br>-d]/f u'? rfxg' x'G5 sL d}n] hlt ;Sbf] | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | jl9 ul0ft k9f];\ ._ | | | | | |
| 36. | I would expect a woman mathematician to be a forceful type of person.<br>-dlxnf ul0ft1 jl9 hj/h:t vfnsf x'G5g\ h:tf] dnfO{ nfUbYof] ._ | | | | | |
| 37. | I know I can do well in math. -dnfO{ yfxf 5 sL d}n] ul0ftdf /fd\|f] ug{ ;S5' ._ | | | | | |
| 38. | Studying math is just as good for women as for men.<br>-ul0ftsf] cWoog ug'{ dlxnfx?nfO{ klg k'?ifx?nfO{ hlQs} /fd\|f] 5 ._ | | | | | |
| 39. | Doing well in math is not important for my future.<br>-ul0ftdf /fd\|f] ug'{ d]/f] eljiosf nflu dxTjk"0f{ 5}g ._ | | | | | |
| 40. | My teachers would not take me seriously if I told them I was interested in a career in science and mathematics.<br>-olb d}n] cfkm' ul0ft tyf lj1fgdf rfv nfu]sf] s'/f jtfP eg] klg d]/f u'?x?n] dxTjsf ;fy lnfg' x'Gg ._ | | | | | |
| 41. | I am sure I could do advanced work in math.<br>-d}n] ul0ftdf hl6n sfo{ klg ug{ ;S5' eGg] s'/fdf d 9'Ss 5' ._ | | | | | |
| 42. | Math is not important for my life. -ul0ft d]/f lhjgsf nflu dxTjk"0f{ 5}g ._ | | | | | |
| 43. | I'm no good in math. -d ul0ft k9\gdf /fd\|f] 5}g ._ | | | | | |
| 44. | I study math because I know how useful it is.<br>-d ul0ft k9\5' lsgsL of] slt pkof]uL 5 eGg] s'/f dnfO{ yfxf 5 ._ | | | | | |
| 45. | Math teachers have made me feel I have the ability to go on in mathematics.<br>-ul0ft lzIfsn] d ul0ft k9\g ;S5' eGg] cg'e"lt lbg' ePsf] 5 ._ | | | | | |
| 46. | I would trust a female just as much as I | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | would trust a male to solve important math problems. -ul0ftsf dxTjk"0f{ ;d:ofx? ;dfwfg ug{df k'?ifnfO{ hlQs} dlxnfnfO{ klg ljZjf; nfU5 ._ | | | | | |
| 47. | My teachers think I'm the kind of person who could do well in math. -d]/f u'?n] 7fGg' x'G5 sL d ul0ftdf /fd\|f] ug{ ;Sg] JolQm xF' ._ | | | | | |
| 48. | I feel boring in the class of female mathematics teacher. -dlxnf ul0ft lzIfssf] lkl/o8df dnfO{ clN5 nfU5 ._ | | | | | |

**SA =Strongly Agree**

**A =Agree**

**N =Neutral**

**D =Disagree**

**SD =Strongly Disagree**

**Thank you for your kind help -tkfO{sf] of] ;xof]usf] nflu xflb{s wGojfb_**

## Appendix B:

## Name of the Schools Selected for the Sample

| S. NO | NAME OF THE SCHOOL | TYPES OF SCHOOLS | RURAL/ URBAN |
|---|---|---|---|
| 1 | SHREE KHAIRENI HIGHER SECONDARY SCHOOL,KHAIRENITAR | GOVERNMENT | URBAN |
| 2 | SHREE STYAWATI HIGHER SECONDARY SCHOOL, DAMAULI | GOVERNMENT | URBAN |
| 3 | SHREE GANESH SECONDARY SCHOOL CHHANG | GOVERNMENT | RURAL |
| 4 | SHREE DIWAS SECONDARY SCHOOL KHAIRENITAR-4 | GOVERNMENT | RURAL |
| 5 | SHREE BRIGHTER FUTURE HIGHER SECONDARY SCHOOL DULEGAUNDA TANAHUN | PRIVATE | URBAN |
| 6 | SUNSHINE BOARDING HIGH SCHOOL, ANBOO TANAHUN | PRIVATE | URBAN |
| 7 | AADARSHA BOARDING HIGH SCHOOL CHHANG ,TANAHUN | PRIVATE | URBAN |
| 8 | SHREE MAHENDRAJYOTI HIGHER SECONDARY SCHOOL SHYAMGHA, TANAHUN | GOVERNMENT | RURAL |
| 9 | SHREE RAMSHAHA HIGHER SECONDARY SCHOOL AANBOO TANAHUN | GOVERNMENT | URBAN |
| 10 | TALBESI SECONDARY SCHOOL DULEGAUNDA TANAHUN | GOVERNMENT | RURAL |
| 11 | SIDDESHWORI SECONDARY SCHOOL GHANSIKUWA TANAHUN | GOVERNMENT | RURAL |
| 12 | BAL BIDHYA HIGHER SECONDARY SCHOOL DULEGAUNDA | PRIVATE | URBAN |
| 13 | RATNA SECONDARY SCHOOL MANAPANG, TANAHUN | GOVERNMENT | RURAL |
| 14 | JANAJAGRITI SECONDARY SCHOOL,CHOK CHISAPANI TANAHUN | GOVERNMENT | RURAL |