

**A STUDY ON ATTITUDE OF SECONDARY LEVEL STUDENTS
TOWARDS MATHEMATICS IN TANAHUN DISTRICT**

A THESIS

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HARI RAJ ADHIKARI

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FACULTY OF EDUCATION
PRITHVI NARAYAN CAMPUS
POKHARA

RECOMMENDATION LETTER

This is to certify that Mr. Hari Raj Adhikari , a student of academic year 2063/2064 with campus Roll No. 227, Exam Roll No.480505/2066 and T.U.Regd.No.16938-89 has completed this thesis under my supervision for the period prescribed by the rule and regulation of T.U. Nepal. The thesis entitled, "**A STUDY ON ATTITUDE OF SECONDARY LEVEL STUDENTS TOWARDS MATHEMATICS IN TANAHUN DISTRICT**" has been prepared based on the result of his investigation conducted during the period of 2012 to 2013 under the department of Mathematics, Prithvi Narayan Campus, Bhimkalipatan, Pokhara . I, hereby, recommend and forward that his thesis be submitted for the evaluation as the partial requirements to award for the degree of Master of Education.

Date: 2069/12/.....

**TRIBHUVAN UNIVERSITY
PRITHVI NARAYAN CAMPUS
FACULTY OF EDUCATION
DEPARTMENT OF MATHEMATICS
POKHARA, NEPAL**

Thesis Submitted

By

HARI RAJ ADHIKARI

Entitled

**"A STUDY ON ATTITUDE OF SECONDARY LEVEL STUDENTS
TOWARDS MATHEMATICS IN TANAHUN DISTRICT"**

Has been approved in partial fulfillment of the requirements for the

Degree of Master in Education

Committee for the Viva – Voce

Signature

1. Asso.Prof. Narendra Narayan Jha
(**Head of Department**)
2. Asso.Prof. Ram Chandra Yadav
(**External Supervisor**)
3. Maheshwor Pokhrel
(**Thesis Supervisor**)

Date:-

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HARI RAJ ADHIKARI

ABSTRACT

This study is mainly concerned with the attitudes of mathematic of secondary level students in Tanahun district.

The collection of data for the study is done with the help of a list of questions entitled "*A modified Fennema-Sherman Mathematics Attitudes Scale*". The opinionnaire was distributed to 184 students of 14 schools: (7 from urban and 7 rural areas, among them 10 from government and 4 from private schools.)

' χ^2 - test' was applied to each item of a set of opinionnaire to find the opinion of boys and girls towards mathematics. The statistical tool 'z-test' was applied to compare the attitudes of boys and girls as well as the attitudes of rural and urban students towards mathematics. Both tests were applied at 0.05 'level of significant'.

For the finalizing process, the study has been organized into five chapters. The first chapter deals with the introduction: background, significance, objectives limitations of the study, history of maths education, statement of problem, hypothesis and conceptual framework. The second chapter is review of literature conducted in this area. The third Chapter deals with the Methodology: design, sample, tools and population of the area of the study, procedures for data collection, scoring and analysis. The fourth one contains the results in the tabular form and its interpretation. The final chapter includes summary conclusion, major findings and recommendation. Finally Bibliography and Appendices are incorporated.

On the basis of analysis and interpretation of the data, the following major findings were drawn:

1. The χ^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.

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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 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 modern 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 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; Kö ce, Yıldız, Aydın, & Altında , 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 sort discussed by people who had a number system based on then and knowledge of duplication and prime numbers. Another thinks the marks were 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, Euclid, Archimedes, Apollanius, Ptolemy etc. played very important role for development of mathematics.

In the Dark Age, from 450 B.C. to 11th 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.

12th 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 13th and 14th century, there were no significant tasks done in mathematics.

In 15th 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, Napier developed Logarithm, Descartes 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, Russell 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)? And 3. 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 mathematics curriculum improvement projects which have been initiated since 1950. After the successful Sputnik in 1957, the 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. The 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 based 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 or 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 or 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 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:

- H₀₁: Secondary level students of Tanahun district have positive attitude towards Mathematics.
- H₁₁: Secondary level students of Tanahun district have negative attitude towards Mathematics.
- H₀₂: There is no significant difference between the attitudes of boys and girls towards mathematics in Tanahun District.
- H₁₂: There is a significant difference between the attitudes of boys and girls towards mathematics in Tanahun District.
- H₀₃: There is no significant difference between the attitudes of urban and rural students towards mathematics of secondary level in Tanahun District.
- H₁₃: 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 than temperament but more 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.

Bhattra 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 χ^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 (Kö ce 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 (Köce 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 (Köce 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 give 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; Köce 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 (Köce 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 3 had 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.

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 administered 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-square 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-square 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-square test:

$$= \frac{\sum \frac{(f_o - f_e)^2}{f_e}}{n} \text{ where } \begin{matrix} f_o = \text{observed frequency} \\ f_e = \text{expected frequency} \end{matrix}$$

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 χ^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)
 χ^2 -value of statements of administered attitude scale to secondary level students

S.N.	STATEMENTS	SA	A	N	D	SD	χ^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, $F_{\alpha, v}^2 = F_{0.05, 4}^2 = 9.488$ is the degree of freedom.

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

Table no. 1(ii)
 χ^2 - Value of Statements of Administered Attitude Scale to Secondary Level
Students in Descending Order
(According to Descending order of χ^2)

S.N.	STATEMENTS	SA	A	N	D	SD	χ^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 χ^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 χ^2 -value.

From the table, the statement no.15" Women can do just as well as men in math" with χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^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 χ^2 -value 39.17,36.89,35.71,33.5 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 χ^2 -value 15.64 at 0.05 level. It was a negative statement and about 52.97% of the students rejected this statement.

Hence from the analysis of the data, presented in Table no.1(ii) we can see the χ^2 -values from 342.42 to 15.64 i.e. all the statements have the χ^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, $X_1^2 = 5413930$

$X_1 = 15990$ no. of questions $N_1 = 48$, so mean $(\bar{X}_1) = \frac{15990}{48} = 333.13$

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

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 $X_2^2 = 5733603$

$$X_2 = 16485 \text{ no. of questions } N_2 = 48, \text{ so mean } (\bar{X}_2) = \frac{16485}{48} = 343.44$$

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

The mean attitude score of boys are compared to those of girls by using z- test.

The computation is as follows:

$$z = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}} = \frac{333.13 - 343.44}{\sqrt{\frac{42.64^2}{84} + \frac{38.74^2}{84}}} = \frac{-10.39}{\sqrt{21.64 + 17.87}} = \frac{-10.39}{\sqrt{39.51}} = \frac{-10.39}{6.29} = -1.653$$

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
Girls	N ₂ =84	343.44	38.74			Null hypothesis is accepted

Where N₁= No.of boys, N₂= No.of girls

S.D. = Standard deviation d.f. = degree of freedom i.e. N₁+N₂-2= 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)	Y²
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 $Y_1^2 = 5409418$

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

$$\text{And S.D.}(S_1) = \sqrt{\frac{Y_1^2}{N_1} Z \frac{Y_1}{N_1}^2} = \sqrt{\frac{5780893}{48} Z \frac{16539}{48}^2} = 41.38$$

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, $Y_2^2 = 5328651$

$$Y_2 = 15859 \text{ no. of questions } N_2 = 48, \text{ so mean } (\bar{Y}_2) = \frac{15859}{48} = 330.39$$

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

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

$$Z = \frac{\bar{Y}_1 - \bar{Y}_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}} = \frac{344.56 - 330.39}{\sqrt{\frac{41.38^2}{84} + \frac{43.03^2}{84}}} = \frac{14.17}{\sqrt{20.38 + 22.04}} = \frac{14.17}{\sqrt{42.42}} = \frac{14.17}{6.51} = 2.176$$

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) ' χ^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 χ^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

प्यारा विद्यार्थी भाई बहिनीहरु मैले “A STUDY ON ATTITUDE OF SECONDARY LEVEL STUDENTS TOWARD MATHEMATICS IN TANAHUN DISTRICT” भन्ने शीर्षकमा एउटा लघुअनुसन्धान कार्य गर्न लागेको छु। यसका लागि यहा ४८ वटा कथनहरु छन्। उक्त कथनहरुको ठीक वा वेठीक उत्तर हुदैनन्। त्यो त तिमीहरुको धारणा र अनुभवमा आधारित हुन्छ। प्रत्येक कथनको ५ वटा सम्भाव्य विकल्पहरु: पूर्ण सहमत, सहमत, अनिश्चित, असहमत, पूर्ण असहमत निर्धारण गरिएका छन्। त्यसैले कथनहरु सावधानी पूर्वक अध्ययन गरी पूर्ण सहमत भए पहिलो कोठामा, सहमत भए दोस्रो कोठामा, अनिश्चित भए तेस्रो कोठामा, असहमत भए चौथो कोठामा र पूर्ण असहमत भए पाँचौ कोठामा () चिन्ह लगाउनुहोस्।

विद्यार्थी सम्बन्धी सामान्य जानकारी

१. विद्यार्थीको नाम:.....
२. विद्यालयकोनाम र ठेगाना:.....
३. कक्षा :..... ४. सेक्सन:..... ५. रोलनं..... ६. लिंग : केटा()/केटी ()
७. ऐच्छिक गणित : लिएको ()/ नलिएको ()

S. N.	STATEMENTS	SA	A	N	D	SD
1.	I am sure that I can learn math. (म विश्वस्त छु की म गणित पढ्न / सिक्न सक्छु)					
2.	My teachers have been interested in my progress in math (मेरा गुरुहरु गणितमा मेरो प्रगति प्रति चासो लिनु भएको छ।)					
3.	Knowing mathematics will help me earn a living. (गणित जान्नाले मेरो जिवनमा कमाइ गर्न सहयोग गर्छ)					
4.	I don't think I could do advanced math. (मैले उच्च तहको गणित पढ्न सक्छु जस्तो लाग्दैन)					
5.	Math will not be important to me in my life's work. (मेरो जिवनमा मेरा लागि गणित महत्वपूर्ण हुने छैन।)					
6.	Males are not naturally better than females in math. (पुरुषहरु स्वभावैले गणित पढ्न महिलाहरु भन्दा					

	सिपालु हुदैन् ।)					
7.	Getting a teacher to take me seriously in math is a problem. (मेरा लागि गणितलाई गम्भिर रुपमा लिने शिक्षक पाउन समस्याको विषय बनेको छ ।)					
8.	Math is hard for me. (मेरा लागि गणित कठिन विषय हो ।)					
9.	It's hard to believe a female could be a genius in mathematics. (महिलाहरु गणितमा पोख्त हुन सक्छन् भन्ने कुरामा विश्वास गर्न गाह्रो छ)					
10.	I'll need mathematics for my future work. (भविष्यमा काम गर्नका लागि मलाई गणित आवश्यक पर्छ ।)					
11.	When a woman has to solve a math problem, she should ask a man for help. (गणितका कुनै समस्या समाधान गर्न महिलाले पुरुषको सहयोग लिनु पर्छ ।)					
12.	I am sure of myself when I do math. (गणितका समस्याहरु समाधान गर्न सक्छु भन्ने कुरामा म विश्वस्त छु ।)					
13.	I don't expect to use much math when I get out of school. (जब म विद्यालयबाट बाहिर निस्कन्छु गणितको खासै प्रयोग हुदैन ।)					
14.	I would talk to my math teachers about a career that uses math. (गणितका उपयोगिताका बारेमा मेरा गणित शिक्षकसंग कुरा गर्ने गर्दछु ।)					
15.	Women can do just as well as men in math. (महिलाले पनि पुरुषले जतिकै गणित सिक्न सक्छन् ।)					
16.	It's hard to get math teachers to respect me. (गणित शिक्षकबाट सम्मान पाउनु मेरा लागि मुस्कलको विषय हो ।)					
17.	Math is a worthwhile, necessary subject. (गणित अत्यावश्यक र महत्वपूर्ण विषय हो ।)					
18.	I would have more faith in the answer for a math problem solved by a man than a woman. (मलाई महिलाले समाधान गरेको गणितीय समस्यामा					

	भन्दा पुरुषले समाधान गरेका समाधानहरुमा विश्वास लाग्दछ ।)					
19.	I'm not the type to do well in math. (म गणितमा राम्रो गर्न सक्ने खालको मान्छे होइन ।)					
20.	My teachers have encouraged me to study more math. (मेरा गुरुहरुले गणित सिक्न प्रोत्साहन गर्नुहुन्छ ।)					
21.	Taking math is a waste of time. (गणित विषय लिएर पढ्नु समयको बर्बादि मात्र हो ।)					
22.	I have a hard time getting teachers to talk seriously with me about math. (मेरा लागि गणितलाई गम्भिर रुपमा लिने शिक्षकको समय पाउनु मुश्किलको विषय हो ।)					
23.	Math has been my worst subject. (मेरा लागि गणित सबैभन्दा खत्तम विषय भएको छ ।)					
24.	Women who enjoy studying math are a little strange. (गणित अध्ययन गरेर आनन्द लिने महिलाहरुलाई अचम्म मान्नु पर्छ ।)					
25.	I think I could handle more difficult math. (मलाई लाग्छ की म अबै कठिन गणित पनि अध्ययन गर्न सक्छु ।)					
26.	My teachers think advanced math will be a waste of time for me. (मेरा गणित शिक्षकले मान्नु हुन्छ कि मैले जटिल गणित पढ्नु समयको बर्बादी मात्र हो ।)					
27.	I will use mathematics in many ways as an adult. (वयस्कहरुले भै म पनि गणितलाई विभिन्न तरिकाले प्रयोग गर्ने छु ।)					
28.	Females are as good as males in geometry. (महिलाहरु पनि पुरुषहरु भै ज्यामितीमा पोख्त हुन्छन् ।)					
29.	I see mathematics as something I won't use very often when I get out of high school. (मैले देखिरहेको छु की म माध्यमिक तह पार गरेपछि मैले गणितको खासै प्रयोग गर्दिन ।)					
30.	I feel that math teachers ignore me when I try to talk about something serious. (जब म गणित शिक्षकसंग ध्यान पूर्वक केही कुराहरु					

	गर्न खोज्छु मलाई वेवास्ता गरेको महशुस हुन्छ ।)					
31.	Women certainly are smart enough to do well in math. (महिलाहरु अवश्यनै गणितमा राम्रो गर्न सक्षम हुन्छन् ।)					
32.	Most subjects I can handle OK, but I just can't do a good job with math. (सवै जसो विषयमा मैले राम्रो गर्न सक्छु तर गणितमा मात्र मैले राम्रो गर्न सकिदैन ।)					
33.	I can get good grades in math. (मैले गणितमा राम्रो अंक प्राप्त गर्न सक्छु ।)					
34.	I'll need a good understanding of math for my future work. (मेरो भविष्यको कामको लागि गणितमा राम्रो बुझाइको आवश्यकता पर्दछ ।)					
35.	My teachers want me to take all the math I can. (मेरा गुरु चाहनु हुन्छ की मैले जति सबदो बढि गणित पढोस् ।)					
36.	I would expect a woman mathematician to be a forceful type of person. (महिला गणितज्ञ बढि जबरजस्त खालका हुन्छन् जस्तो मलाई लाग्दथ्यो ।)					
37.	I know I can do well in math. (मलाई थाहा छ की मैले गणितमा राम्रो गर्न सक्छु ।)					
38.	Studying math is just as good for women as for men. (गणितको अध्ययन गर्नु महिलाहरुलाई पनि पुरुषहरुलाई जतिकै राम्रो छ ।)					
39.	Doing well in math is not important for my future. (गणितमा राम्रो गर्नु मेरो भविष्यका लागि महत्वपूर्ण छैन ।)					
40.	My teachers would not take me seriously if I told them I was interested in a career in science and mathematics. (यदि मैले आफु गणित तथा विज्ञानमा चाख लागेको कुरा बताए भने पनि मेरा गुरुहरुले महत्वका साथ लिनु हुन्न ।)					
41.	I am sure I could do advanced work in					

	math. (मैले गणितमा जटिल कार्य पनि गर्न सक्छु भन्ने कुरामा म ढुक्क छु ।)					
42.	Math is not important for my life. (गणित मेरा जिवनका लागि महत्वपूर्ण छैन ।)					
43.	I'm no good in math. (म गणित पढ्नमा राम्रो छैन ।)					
44.	I study math because I know how useful it is. (म गणित पढ्छु किनकी यो कति उपयोगी छ भन्ने कुरा मलाई थाहा छ ।)					
45.	Math teachers have made me feel I have the ability to go on in mathematics. (गणित शिक्षकले म गणित पढ्न सक्छु भन्ने अनुभूति दिनु भएको छ ।)					
46.	I would trust a female just as much as I would trust a male to solve important math problems. (गणितका महत्वपूर्ण समस्याहरु समाधान गर्नमा पुरुषलाई जतिकै महिलालाई पनि विश्वास लाग्छ ।)					
47.	My teachers think I'm the kind of person who could do well in math. (मेरा गुरुले ठान्नु हुन्छ की म गणितमा राम्रो गर्न सक्ने व्यक्ति हुँ ।)					
48.	I feel boring in the class of female mathematics teacher. (महिला गणित शिक्षकको पिरियडमा मलाई अलिख लाग्छ ।)					

SA =Strongly Agree

A =Agree

N =Neutral

D =Disagree

SD =Strongly Disagree

Thank you for your kind help (तपाईंको यो सहयोगको लागि हार्दिक धन्यवाद)

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