CHAPTER - I
INTRODUCTION

1.1   Background of the Study

The word mathematics has been derived from the ancient Greek word "Manthancian" meaning to "learn" where as in Nepali, it is called "Ganit" which means "the science of calculation". Mathematics has been explained in other ways also such as, it is the numerical and calculation part of man's life and knowledge. It is also defined as the science of abstract form. According to Locke, "Mathematics is a way to settle in the mind a habit of reasoning. According to Oxford Dictionary, "Mathematics is the science of number and space. According to Hilbert, "Mathematics is nothing more than a game played according to certain simple rules with meaningless works on paper". Roger Bacon believed that mathematics is the gate and key to all sciences. "Mathematics is the language of physical sciences and certainly no more marvelous (excellent) language was ever created by the mind of man" (Lindsay) "Mathematics is the science of ideas furnished by sensation and reflection in respect to their necessary consequences" (Philo of Alexandria (100 B.C.)).

Mathematics holds the mirror of civilization. It is no exaggeration to say that the history of mathematics is the history of civilization. Every society has observed mathematics as the basic needs of human civilization. Mathematics has started at the infancy level from the beginning of human civilization to the advanced level of twenty first century.

Broadly speaking, mathematics is a way of thinking, a way of organizing, analyzing and synthesizing a body of data, language, symbolism and body of knowledge in the area of science with its own symbolism, terminology, contents theorems and techniques.

One cannot do without the use of fundamental processes of mathematics in daily life. A common man can get on sometimes very well without learning how to read and write, but he can never pull on without how to count and calculate. Any person ignorant of mathematics will be at the mercy of others and will be easily cheated. Counting, notation, addition, subtraction, multiplication, division, weighing, measuring, selling, buying and many more are simple and fundamental processes of

mathematics which have got an immense practical value in life. In many occupations such as accountancy, banking, shop-keeping, business, tailoring, carpentry, taxation, insurance, computer, applications, postal jobs, by which the needs of man are fulfilled, indirect or direct use of mathematics is made. It has become the basis of the world's entire business and commercial system. It is very helpful in the study of various useful sciences. Ignorance of mathematics in the masses is a formidable obstacle in the way of country's progress. Even Napoleon said, "The progress and the improvement of mathematics are linked to the prosperity of the state".

There can be no doubt about the validity of the statements that mathematical processes were invented in accordance with the requirements of mankind. Natural phenomena follow mathematical principles eg, the change of seasons, speed of rotation of planets, the rising and setting on the sun and appearing of the stars etc. Time is specified in each case.

Mathematics trains or disciplines the mind. Due to its very nature, it possesses a real disciplinary value. It is exact, true and to the point knowledge and therefore creates a discipline in the mind. Its truths are definite and exact. Reasoning in mathematics possesses certain characteristics which are suitable for the training of the learner's mind. If properly emphasised and streamlined, these characteristics are likely to develop the corresponding habits in the learner.

The understanding of the world in which man lives, of the civilization to which he belongs and of the culture of which he is very proud, requires the understanding of scientific and social principles the development of which depends, in turn, upon mathematical principles. Mathematics has got its cultural value and this value is steadily increasing day by day. The prosperity of man and his cultural advancement have depended considerably upon the advancement of mathematics. Mathematics is also a pivot for cultural arts, such as music, sculpture, poetry and painting.

Mathematics plays an important role in the organization and maintenance of our social structure. Mathematics enables us to understand the inter-relations of individuals and the possibilities of various groups. It regulates the functioning of society in many ways. History of mathematics reveals that whenever a society gave due weightage to the knowledge of mathematics, it made a tremendous progress.

When mathematics makes its contribution in the advancement of science and technology, society draws huge benefits. Its contribution is evident in the fields of atomic energy, space research, space travel and man-made satellites.

The study of mathematics helps us in the development of many intellectual traits like power of thinking and reasoning, induction, analysis, synthesis, originality, generalization, discovery etc. Every mathematical problem poses an intellectual challenge and is a unique mental exercise. The subject is taught for the development of power rather than knowledge.

Mathematics has international value. Mathematics is a universal subject and it helps in creating international understanding. Its history presents a very good picture of the overall development of our civilization. Mathematics is the common heritage of mankind and it is not an exclusive property of any particular nation, race or country. Mathematics is a symbol of agreement all over the world. It is the same everywhere.

Education is a means for the development of an individual to adjust in a society. It is essential to flourish the potentiality and prospects of personality development in every body. Persons regard education as society's most important mechanism for ensuring that individuals have control over their own development (Dalin, 1998). Functional theoreticians such as Talcott Parsons and Emile Durkheim believe that education develops skill to the individual for modern industrial life".

Mathematics education is defined as a science that deals mathematics from education point of view, comprises different aspects- philosophical, psychological and sociological. Mathematics education also has its own terms and terminologies but doesn't have axioms, postulates and theorems. Instead, it has its own theories and concerns to the problems of learning and teaching. Mathematics educators are not obliged to create new mathematics or make new generalization.

Formally, mathematics education as a discipline got reorganization from first International Conference of Mathematics held at Lyons in August 1969. Mathematics education takes place in different environmental factors such as student background and his/her surroundings, influences including scientific attitudes. Finally, mathematics education concerns about curriculum framing, teaching and evaluation of mathematical learning (Parajuli and Subedi; 2001).

There has been a change in the worlds' perception of right to education over

the past few decades whereas, the Universal Declaration of Human Rights proclaims that "Every one has the right to education". The declaration adopted by the world conference on education for all proclaims, "Every person-child, youth and adult shall be able to benefit from educational opportunities designed to meet their basic learning needs" (UNESCO, 1976).

It is already mentioned that mathematics education is necessary to every field and every person. In ICMI IV, the most expected slogans were "mathematics for all and every day life mathematics". So we can say that mathematics education is necessary to almost all students whether they are normal or handicapped in their daily life.

1.2 Historical Development of School Level Mathematics Education in Nepal

The development of mathematics education at the different ups and downs of the history of Nepal is attempted to present under this sub-topic. The history of mathematics education in Nepal begins from the vedic period (earlier than 3000 B.C.). One of the Vedas called Rigveda treats mathematics. Before the Rana regime, there were a few monasteries (Gopas) where boys could learn to read to become Lamas and Hindu priests used to teach religion to a few boys at the temples. The main subjects of study were Lipi or Lekha (alphabets, reading thd writing), Rupa (drawing) and Ganana (arithmetic).

Some Sanskrit scholars used to open Sanskrit schools in the more populated areas to teach Sanskrit and Astronomy (as mathematics). The so-called curriculum in the Buddhist and Gurukul education system or Sanskrit schools embraces all aspects of religion rites for catering to the daily needs of the people. The formal school system, Buddha Pathsala at Gantaghar in Kathmandu which was in existence even upto the year 2002 B.S. had included arithmetic as one of the contents of teaching.

The English system of edcuation started with the establishment of Durbar school in the autumn of 1853 A.D. (27th Ashwin 1910) by Prime Minister Jang Bahadur Rana after his return from England. This school was located at Gol Baithak (Dakh Chok) in Thapathali Durbar for educating the children of PM Jang Bahadur and his closest relatives. The school had some European and some Indian teachers.

Same type of school was later opened in Hanumandhoka Durbar. These schools taught only up to standard five following the syllabus containing Ganit, writing of poetry and fiction and some other books. Later, Durbar school was affiliated with Calcutta University and it started its teaching up to secondary level changing its name as Durbar High School. The same design as developed by Macaulay to introduce in British India in 1873 A.D. was copied in Nepal. From 1901 A.D., general public got the admission in Durbar High School. Many schools were opened during the period of PM Dev Shamser. Mathematics occupied the important position in the syllabus at that time. The course of Sresta Pathsala (1962 B.S.) also had included arithmetic in it.

Only after the organization of the School Leaving Certificate (SLC) Examination Board (Nov. 1, 1932), courses of study were framed in Nepal for SLC level. That first curriculum for secondary level had included compulsory mathematics of 100 marks along with additional mathematics (as one of the optional subjects) of 100 marks. The vocational training started with the name of Adhar Shiksha (1947 A.D) had given imphasis on mathematics. For the SLC examination of 2005 B.S., in place of compulsory mathematics, arithmetic (50 marks) and Nepali Sresta (50 marks) or domestic arithmetic (50 marks) were introduced. By 2007 B.S., there were only 310 primary, 11 secondary and 40 religious schools in Nepal. Two colleges also were established in the Kathmandu Valley.

The necessity of this important subject was given more emphasis since the dawn of democracy in 2007 B.S. (1951 A.D.). New methods and ideas were practised to bring about rational changes in the overall education system. In 2008, the household account (50 marks) was added with domestic arithmetic. The girls had option to read mathematics but for boys it was a compulsory subject of 50 marks and if chosen, an optional subject of two papers containing 200 marks. Nepali Siksha Parishad (32 Srawan 2008 B.S.) conducted the examination of Praveshika (equivalent to SLC). Its curriculum had included arithmetic (50 marks) and Nepali Sresta or algebra and geometry (50 marks) as compulsory mathematics. There was no optional mathematics.

Education Ministry published the Primary Education Curriculum in 2010 for the first time to maintain uniqueness in teaching at primary level. Nepal National Education Planning Commission (2011 B.S.) put compulsory mathematics in the curriculum of multi-purpose secondary schools. Advanced mathematics was also

included in the college preparatory area of the vocational work. All round National Education Committee (2018 B.S.) had included compulsory mathematics as well as optional mathematics (Higher Mathematics) in the art and science schools but only the optional mathematics in the vocational and Sanskrit schools. In the curriculum brought out by NESP, compulsory mathematics and optional mathematics again occupied their earlier position in general schools but in vocational and Sanskrit schools, there was no room for optional mathematics. NESP emphasized in making mathematics life-oriented and practical by revising and improving mathematics curriculum and adopting an effective teaching method. Actually, mathematics has been taught as a compulsory subject at all levels of the school education system in Nepal especially after the implementation of NESP. Since then about 12% of the total time has been allotted to it at secondary level.

NESP had clearly defined the objectives of mathematics for primary (1-3), lower secondary (4-7) and secondary (8-10) level. The objectives of primary level were to make the students literate mathematically and to provide the basis of mathematics for lower secondary level. For lower secondary level, the objectives were to make the students able to use mathematical operation in solving daily life problems, get mastery over different mathematical facts, rules, formulae and for the secondary level, the students should get accuracy and facility in mathematical computation in solving verbal problem, learn geometrical relations, axioms and theorems.

In 2038 B.S., vocational schools were changed into general schools and a minor revision of school mathematics text-books was done. But after the restoration of democracy in 2046 B.S., the need of change was realized and incorporated in the overall school level curriculum in Nepal. In this way, the revision in the secondary school level curriculum took 18 years to come into action.

Since 2050 a revised school curriculum was proposed from primary to secondary level in Nepal. The students faced the S.L.C. of 2058 with new curriculum and examination system. All the changes are said to have been made as and according to the recommendations made by National Education Commission of 2049 and Higher Level National Education Commission of 2055 to bring about contemporary reforms in the school level education to meet the public desire and the changed context of the nation. The revision of school mathematics curriculum took place also

with a spirit of maintaining the standard of school mathematics education in the SAARC region from the aspect of pedagogy and the subject matter. Mathematics is one among the six compulsory subjects in the SLC. New compulsory mathematics at secondary level has the aim to help in developing necessary mathematical skills in each students for employment, study, training and future life, to provide necessary mathematical subject matters to each students for the study of other subjects and to provide the desire to understand the importance of mathematics, to help enjoying it and to realize and continue one's role to develop the nation. The new curriculum has initiated quite a lot of new topics both in compulsory and optional mathematics.

1.3   The Blind and Education of Blind

A person is commonly classified as blind when vision is insufficient for use in task in which eye sight is essential (Beton, 1960).

Blindness is the partial or total loss of the ability to see. Blindness has existed all through human history. There are many different kinds of blindness and there are many disease and accidents that can cause blindness. Blindness is an important social problem. People who suffer from various forms of blindness find it dificult to earn a living and to take part in the activities of society. Special provision must be made for them if they are to be educated and made able to support themselves.

In terms of causes there are two main kinds of blindness. Some persons may be born with defective eyes and thus be unable to see. This is called congenital blindness. Others may lose their sight through injury, accident or disease. This is called acquired blindness.

There are four principle kinds of blindness, in terms of how much a victim of blindness can see, A person suffering from total blindness can not tell light from dark. Economic blindness means that a person can not see well enough to work for a living in any way that requires the use of the eyes. Vocational blindness is the loss of sight that prevents a person from continuing to earn a living in the same kind of work that he has been doing. The fourth kind of blindness is called educational blindness. This is loss of the ability to see that interferes with a person's ability to get an education by the methods that are commonly used in schools (The World Book Encyclopedia B, Volume 2).

Blindness is the condition of lacking visual perception due to physiological or neurological factors.

Various scales have been developed to describe the extent of vision loss and define blindness. Total blindness is the complete lack of form and visual light perception and is clinically recorded as NLP, an abbreviation for "no light perception." Blindness is frequently used to describe severe visual impairment with residual vision. Those described as having only light perception has no more sight than the ability to tell light from dark and the general direction of a light source.

In order to determine which people may need special assistance because of their visual disabilities, various governmental jurisdictions have formulated more complex definitions referred to as legal blindness. In North America and most of Europe, legal blindness is defined as visual acuity (vision) of 20/200 (6/60) or less in the better eye with best correction possible. This means that a legally blind individual would have to stand 20 feet (6.1m) from an object to see it-with corrective lenses with the same degree of clarity as a normally sighted person could from 200 feet (61m). In many areas, people with average acuity who nonetheless have a visual field of less than 20 degrees (the norm being 180 degrees) are also classified as being legally blind. Approximately ten percent of those deemed legally blind, by any measure, have no vision. The rest have some vision, from light perception alone to relatively good acuity. Low vision is sometimes used to describe visual acuities from 20/70 to 20/200.

By the 10th Revision of the WHO International Statistical Classification of Diseases, Injuries and Causes of Death, low vision is defined as visual acuity of less than 6/18 (20/60), but equal to or better than 3/60 (20/400), or corresponding visual field loss to less than 20 degrees, in the better eye with best possible correction. Blindness is defined as visual acuity of less than 3/60 (20/400), or corresponding visual field loss to less than 10 degrees, in the better eye with best possible correction.

In 1934, the American Medical Association adopted the following definition of blindness:

Central visual acuity of 20/200 or less in the better eye with corrective glasses or central visual acuity of more than 20/200 if there is a visual field defect in which the peripheral field is contracted to such an extent that the widest diameter of the visual field subtends an angular distance no greater than 20 degrees in the better eye.

In the UK, the Certificate of Vision Impairment (CVI) is used to certify patients as severely sight impaired or sight impaired. The accompanying guidance for clinical staff states:

The National Assistance Act 1948 states that a person can be certified as severely sight impaired if they are "so blind as to be as to be unable to perform any work for which eye sight is essential (National Assistance Act Section 64) The test is whether a person can not do any work for which eyesight is essential, not just his or her normal job or one particular job.

In practice, the definition depends on individual visual acuity and the extent to which their field of vision is restricted. The Department of Health identifies three groups of patients who may be classified as severely visually impaired.

1. Those below 3/60 Snellen (most people below 3/60 are severely sight impaired)

2. Those better than 3/60 but below 6/60 Snellen (people who have a very contracted field of vision only).

3. Those 6/60 Snellen or above (people in this group who have a contracted field of vision especially if the contraction is in the lower part of the field).

The Department of Health also state that a person is more likely to be classified as severely visually impaired if their eyesight has failed recently or if they are an older individual, both groups being perceived as less able to adapt to their vision loss.

Most visually impaired people who are not totally blind read print, either of a regular size or enlarged by magnification devices. Many also read large print, which is easier for them to read without such devices. A variety of magnifying glasses, some handheld, and some on desktops, can make reading easier for them. The rest read Braille.

Braille is a code of small raised dots on paper that can be read by touch. Louis Braille, a 15-years old blind French student, developed a raised dot-dash reading system in 1824. Blind persons read Braille by placing the tips of their fingers on raised dots. Some can read 200 words a minute.

Braille books are pressed from metal plates. The characters are stamped on both sides of the paper by a method called inter-pointing. The dots on one side of the page do not interfere with those printed on the other side.

The number of blind people in the world is not accurately known, but has been estimated by the World Health Organization (WHO) to be approximately 38 million. A further 110 million people have low vision and are at risk of becoming blind. The main causes of blindness and low vision are cataract, trachoma, glaucoma, onchocerciasis and exophthalmia.

In 1990, there were approximately 38 million blind people in the world, with a global prevalence of 0.7%. Surveys in 17 countries showed the estimated prevalence of low vision to be approximately 110 million. Therefore, the total burden of visual impairment (people blind or with significant visual loss) was estimated at 148 million. 22 million blind people (58% of the global blind population) are aged ≥ 60 years, while only 3.8% (approximately 1.5 million) of children aged ≤ 4 years old are blind. Developing countries, with 58.5% of the global population aged > 60 years, have 88.8% of the blindness in this age group (Asian Journal of OPHTHALMOLOGY)

As per the sample survey conducted in Nepal by National Blindness Survey in 1980 in an eye to the International Year of Disabled Person (IYDP), 1981, the population of the blind was estimated 0.84% of the total population of the country. That was the first survey of persons with disabilities in Nepal and according to the WHO/PBL/93.27 and WHO/PBL/00.77 the number of low vision persons is estimated even more. If we considered the above data, the number of the BPS persons seemed to be covered more that 2% of the total population. The household survey conducted by NAB/NABP in its Community Based Rehabilitation Project lunched area Chitwan district showed 1.24% i.e. 5223 population in the district. Likewise, in Dang district 1.12% i.e. 5073 population. This figure includes both blind and low vision. Mostly the blindness is occurred due to Cataract and its squeal, Glaucoma, Xerophthalmia, Vitamin-A deficiency, Ocular infections and Poor victims of congenital diseases. The majority of the Blind and Partially Sighted (BPS) persons live in far-flung areas in miserable conditions having despondency, depression and frustration in the absence of opportunities. In fact, the Blind and Partially Sighted (BPS) persons have really been facing numerous problems for their livelihood. And they are lacking self-confidence, a strong unified voice and personal health care and leadership skill. As

being a developing country of the world, blindness in Nepal is not only a health problem but also a social and economic problem. There is a general feeling among people; blindness is punishment of the God due to ignorance and superstition and lack of information about its pathology. Attention to the needs of the BPS persons has never been a national priority in Nepal. The blind has always been neglected in all aspect of development. So, very few blinds are able to get facilities. The total numbers of blind people in Nepal are approximately 200,000. According to door to door survey conducted by CBR it is known that 1445 are blind in Kaski district.

As we glance in the history of education for blind from the encyclopedia Britannica (vol-3, 1960), Louis IX of the France established an institute in 1760 for the care of the blind in Paris. Similarly, Hany opened Institution National des Jeunes Aveugles (INJA) in 1784 in Paris and successfully taught 12 children and many institutions and school were established during 1791 to 1871 in the favor of blind children. The Louis Braille (1809-52) a blind teacher of INJA, invented a 12-cell dots system that was easy to write with simple instrument. In 1893 Frank Hall of Jacksonville invented a stereotyping (typing technique for Braille) machine for embossing (carve) a metal plates, which serves as masters, so that they could be well (inter-pointing) (Subedi, 2003).

The historical development of blind education in Nepal was that, it was in 1961 (2018 B.S.) that the rotary club sponsored a blind person, Mr. Kumar, to go to US to attend a one month training program at the Parkinsas Institute for the blind (Koirala, 2052). This was a land mark in the education for the disable persons in Nepal, especially the blind. Education for visually impaired children was started in Nepal in 1964 A.D. as an integrated special education in Kathmandu. Existing blind school and projects are trying their best to educate the blind children in integrated concept. In spite of blind their valuable contribution to this field, quit a large number of children are still deprived of educational opportunity. So it is imperative to pay attention to increase the quality as well as quantity of education for visually impaired/blind children. Teaching blind is very difficult job. Special-trained teacher only can overcome this task properly. The government and other non-government organization are providing such types of training for the teacher of integrated schools.

There are about 75 schools for blinds in the country. Amar Singh Higher Secondary School is one of them. It is highly reputed school in Kaski district. It was

established in 2013 B.S. Blind students were started to learn in this school from 1981 A.D. (2038 B.S.).

1.4   Attitude: Attitude is explained in various ways such as:

1.   Feeling of favourableness or unfavourableness towards some group, institution or proposition (R.L. Thorndike).

2.   Attitude is evaluated statement or judgments concerning objects, people or events" (Stephen P. Robbins).

3.   Attitudes are a person's complexes of beliefs and feelings about specific ideas, situations or other people (Moorhead and Griffin).

4.   Ken Afful "Attitudes are-

   a)   Tend to persist unless something is done to change them.

   b)   Can fall anywhere along a continuum from very favourable to very unfavourable.

   c)   Directed towards some object which a person has feeling and beliefs.

5.   "An attitude is the degree of positive or negative effect associated with some psychological object which way be symbol, phase, slogan, person, intuition, ideal or idea toward which people can differ with respect to positive or negative effect" (All port, 1935:194).

6.   According to Good (1945), attitude is "a state of mental and emotional readiness to react to situations persons or things in a manner in harmony with a habitual pattern of response previously conditioned to or associated with their stimuli".

7.   An attitude, according to Anastasi (1961) is a tendency to react favourably or unfavourably towards a designated class such as rational or racial groups, a custom or an institution.

Attitude plays a crucial role in teaching and learning mathematics. The positive attitude towards mathematics is considered to play an important role causing students to learn mathematics. Dwigth, in 1966 states about the teachers influence on students' attitude, towards mathematics in following:

"The attitudes of the elementary teacher towards mathematics overshadow the influence from all other sources on the attitudes of his students towards the subject. If mathematics is dull, uninteresting and meaningless to a teacher it will be the same to a major portion of his students".

Thomas in 1978 had also observed that- "An attitude is considered to be a property of an individual personality, less in during than temperament but more enduring than motive or mood. All social scientists also agree that attitude cannot be directly measured or observed and, so like many others concept such as intelligence, personality traits, values and motives, are conceptual invention or in other words a hypothetical construct".

According to above observation attitude is conceptual thing to develop positive attitudes and to play important role in causing students to learn mathematics. It is also necessary for mathematics teacher to improve mathematics achievement to their students.

1.5   Statement of the Problem

This study is mainly concerned with blind students attitudes toward mathematics and its relationship with their achievement enroll in Amar Singh Higher Secondary School. Researcher seeks to answer the following questions:

i)   What are the attitudes of blind students towards mathematics?

ii)   Does the attitude towards mathematics of blind boys differ form the blind girls?

iii)   Does the mathematics achievement of blind boys differ from the blind girls?

iv)   Does the blind students' attitude towards mathematics correlate with their mathematics achievement?

1.6   Significance of the Study

The main significances of this study are as follows:

i)   This study provides necessary information about eductional status of blinds. So the ministry of education will step forward for imporving their educational condition.

ii)   This study further informs the government other concerned authorities, policy makers and planners of education about how to make education plans, policies and their corresponding strategies to promote the academic qualities of the blinds in Nepal.

iii)   The result of this study helps the national policy maker, mathematics curriculum designer, researcher persons, educational administration, educationist's counselor and other concerned personnel to consider in their work related to it.

iv)   The result of this study intends to determine the blind students' attitude towards mathematics.

v)   This study helps to improve mathematical attitude with achievements of lower secondary level's students.

vi)   It helps to improve effective teaching and learning mathematics in lower secondary level.

vii)   It helps to improve the concepts of students towards mathematics and to learn interestingly.

1.7   Objectives of the Study

This study intended to accomplish the following objectives:

i)   To determine the attitude of blinds students towards mathematics.

ii)   To compare blind boys' and girls' attitudes towards mathematics.

iii)   To compare the mathematics achievement of blind boys and blind girls.

iv)   To determine the relationship between attitude and achievement in mathematics.

1.8   Research Hypothesises

The following research hypotheses are formulated for the study:

i)   There is no significant difference between blind boys and girls attitude towards mathematics.

ii)   There is no significant difference between blind boys and blind girls achievement in mathematics.

iii) There is no significant relationship between blind students attitude and achievement in mathematics.

1.9   Limitations of the Study

Any study cannot overcome all the fields. Each of them has some limitations. This study also has some limitations, which are as follows:

i)   The study is conducted for the subject of mathematics only.

ii)   This study is limited in Amar Singh Higher Secondary School only.

iii) The study is based on attitude of lower secondary level blind students only.

iv)   All blind students of lower secondary level of Amar Singh Higher Secondary School are taken for this study.

1.10   Definition of the Terms

Although the familier terms were used in this study, which have been defined again. These terms are as follows:

i)   Attitude: Here, attitude is used to mean feeling about mathematics. In this study attitude is defined as "the emotionalized feeling of students for or against something".

ii)   Achievement: Achievement measures of current capacity depending directly upon previously acquired skills and information. It is used for assessing present knowledge and abilities.

iii) Blind: "For education purpose a blind person is one whose vision is so defective that he/she can not be educated through visual methods".

iv)   Lower Secondary Students: Students in this study refer to those blind boys and girls of Amar Singh Higher Secondary School who are just starting grades 7, 8 and 9 in session 2067 B.S. i.e. after the completion of grade 6, 7 and 8.

v) Attitude scale: An inquiry form or scale used to obtain the measure of attitude of an individual towards some phenomenon is known as attitude scale (Best and Khan, 1997). In this study attitude scale is a scale used by researcher to obtain the measure of attitude of blind students which was developed by George Levine.

CHAPTER - II
REVIEW OF RELATED LITERATURE

Before planning the details of a study, researchers usually dig into the literature to find out what has been written about the topic they are interested in investigating. A collective body of works done by earlier scientists or researchers is technically called the literature. Both the opinions of experts in the field and other research studies are of interest for the new study. Such reading is referred to a "review of the literature"

A review of related literature is source of the further study of research task. It helps to research the research programmes and gives the better idea of a surveying in the research hypothesis. Then it guides to reach hypothetically nearly to the conclusion. This review of related literature is important and essential for guideline of research planning. Review of the previous studies and the authority of the concerned field of the study serves the researcher to eliminate the duplication of what has been done and provides useful hypothesis and helpful suggestions for the study. Therefore, the review section of the research report is considered very important. The purpose of the review of literature is to expand upon the context and background of the research.

A number of studies conducted by Nepalese researchers have investigated the attitudes of teachers and students towards mathematics. In the course of writing the thesis works, the researcher reviewed and studied different literature which are as follows:

Pandit (1980) did his thesis of Master's Degree on "Attitude of secondary schools students and their parents towards mathematics and other subjects of instruction". Two attitude scales, one for students and other for their parents, developed by George Levine were adopted as instruments to generate data and two hundred and ten students and the same numbers of parents of these students were taken as sample. The findings of his study were.

- Both the students and their parents ranked mathematics the highest on most of the attitude statements.

- Both the students and their parents ranked social studies the lowest on all the attitude statements.

- Both the students and their parents ranked English and Science in the middle of most of the attitude statements.

- The mean measure of the attitudes of male students towards mathematics as a school subject was significantly greater than that of female students.

- No grade-wise variations in students' attitudes towards mathematics could be detected.

- The mean measures of attitudes of parents of the male students and the female students did not differ to a significant extent.

- Parents of the male students exhibited a tendency to hold a higher level of expectations from their sons in the study of mathematics than the parents of the female students.

CERID, (1980) did a research on the topic "Achievement study of Primary School children, Kathmandu" and found that a greater difference between the achievement of boys and girls.

Tiwari (1984) studied boys' and girls' attitudes towards mathematics in Lalitpur district. One hundred and twenty male students and ninety seven female students from 9th grade of seven secondary schools and one hundred and eighty six parents were taken as sample, the conclusions extracted from the findings of has study were:

- Girls seemed more benefited than boys in the mathematics instruction conducted in the school level.

- Although both boys and girls held positive views that mathematics could be learned by anyone, boys seemed to exhibit higher percentage in support of this view.

- Both boys and girls held positive attitudes towards the place of mathematics in society. Comparing the attitudes of the sexes, girls seemed to dominate boys in response to this view.

- The mean measures of the attitudes of boys and girls differed significantly. This indicated that boys' tendency of learning mathematics was significantly higher than that of the girls.

- Since the correlation between students' and their parents' attitudes was statistically significant, it was concluded that they were closely related.

- The correlation between students' attitude towards mathematics and their achievements in this subject were found to be significant. It indicated that they were closely related to each other.

Ghimire (1997) did a research on a "Teacher attitudes towards the integration of visually impaired students in mathematics in normal Nepalese Schools". The study was conducted on 40 teachers from schools selected through purposive sampling technique. A likert type attitude scale with 34 items was developed by the investigator. For analyzing the obtained data 't' test and analysis of variance were used at 0.05 level. The major findings of the study were:

- Teachers working in government and privately managed school did not differ significantly in their attitudes towards the integration of visually impaired students in normal schools.

- There was no significant difference in the attitudes of teachers working in primary lower secondary and secondary school towards the integration of visually impaired students in normal schools.

- The teachers teaching in integrated schools had significantly more positive attitude than teachers teaching in non-integrated schools towards the integration of visually impaired students.

- Male and female teachers did not differ significantly in their attitudes towards the integration of visually impaired students.

- There was no significant difference in attitudes of teachers as far as their length of experience was concerned towards the integration of visually impaired students in normal schools.

During (1981) Mrs. Tara Karki has noted some problem in the case of educating blind in her articles published by Nishaya Sewa Samanwaya Samittee, Kathmandu. She has mentioned that the blind rushing for education from different part of Kingdom cannot get admitted in the blind school due to the lack of the adequate finance. Those who became successful to get admitted in the limited seat are taught for the purpose of making them simply literate. Vocational training opportunity

is rare due to the lack of vocational training centre, lack of trained teachers and instructional materials are also hampering blind education (Karki, 2038).

Luitel (1997) did a research on "A study of attitudes of secondary school students towards mathematics and its relationship with their achievement in mathematics. "He concluded that no significant difference was found by school types and by grade wise. But he found significant difference by genders. He also found that all the coefficients of correlation between attitude and achievement by secondary school students were significant".

Paudel (1999) did a research on the topic "a comparative study of attitudes of mathematics teachers towards the learning disabled and non learning disabled students in mathematics". Likert type of attitude scale was developed and standardized by the researchers. The scale was tried out on a sample of forty mathematics teachers. The mean, standard deviation and percentage of the scores of the whole sample were computed. Several comparisons were done by using t-test and analysis of variance techniques. The major findings of the study were:

- The mathematics teachers had the positive attitudes towards the learning disabled and non-learning disabled in mathematics.

- Teachers working in government and private schools did not differ significantly in their attitudes towards the learning disabled and non-learning disabled students in mathematics.

- There was no a significant difference in the attitudes of teachers teaching in different levels of schools towards the learning disabled and non learning disabled students in mathematics.

- The teaching experience was significant related to the formation of different types of attitudes in teachers towards the learning disabled and non learning disabled students in mathematics.

- There was no significant difference in the attitudes of trained and untrained teachers towards the learning disabled and non-learning disabled students in mathematics.

- Male and female teachers did not differ significantly in their attitudes towards the learning disabled and non learning disabled students in mathematics.

- Teachers' academic qualifications were significantly related to the formation of different types of attitudes in teachers towards the learning disabled and non learning disabled students in mathematics.

- There was a significant difference in the attitudes of teachers with different age groups towards the learning disabled and non-learning disabled students in mathematics.

Subedi (2001) did a research on "A study on the effectiveness of mathematics teachers' attitude towards the visually impaired/blind student's achievement in integrated school". With the aim to study the effectiveness of mathematics teachers' attitudes towards the visually impaired (blind) students' achievement in integrated schools of Gandaki, Bagmati and Dhaulagiri zone and concluded that, specially trained and untrained teachers had positive attitude towards the blind students and untrained teachers had significantly better attitudes towards the blind students.

Kafle (2001) in his aim of study "A study on attitude of secondary level students and teachers towards compulsory mathematics curriculum", he selected 160 students and 15 mathematics teachers from Kavre district and he concluded that students had positive attitude and teachers had negative attitude towards compulsory mathematics. He also concluded that there was no gender wise difference attitude of students towards mathematics and mean attitude score of students and teachers had same towards mathematics curriculum.

Tiwari (2002) did a research on "A study of attitudes of farmer and non farmer parents towards school mathematics". He concluded that farmer and non farmer parents had positive attitude towards the school mathematics. Non farmer parents have emphasized their children towards the school mathematics than the farmer parents. Both types of parents had given higher priority towards their male child than their female child about the mathematics".

Adhikari (2002) conducted a research study on the topic "A comparative study of achievement by orphan and non-orphan students in mathematics at primary level in Dhading district", he found that:

- Non orphan students' achievement score was higher than orphan students' achievement score and there was significant difference between their mean scores.

- Orphan boys' achievement score was higher than orphan girls' achievements score.

- Non orphan boys' was higher than orphan boys' score.

- Non orphan girls' score was higher than orphan girls' score.

- Teachers opinion was negative towards orphans' education and

- Guardians' view was negative towards orphans' education.

Panta (2004) in her study "Attitude of secondary level students and teachers towards geometric transformation", she selected 25 mathematics teachers and 260 students from 72 secondary schools in Chitwan district and she concluded that:

- There was a positive attitude of secondary level students and mathematics teacher.

- Though the mathematics teacher had positive attitude towards geometric transformation, there should be conducted refresher training program in this topic.

- There was no gender wise difference in attitude among students.

- Both boys and girls had significantly better attitudes than teachers towards in this subject.

Baral (2005), did a research on "Attitudes of orphan students towards mathematics and its relationship with their achievement". For the study he used questionnaire developed by George Levine. It was consisted 32 statements. For this study the researcher selected 102 orphan students. Among them 60 were boys and 42 were girls from five districts' SOS Herman Gmeiner Schools. Findings of the study were:

- Orphan students have the positive attitude towards mathematics.

- There was significant difference between orphan boys and girls students' attitude toward mathematics.

- Orphan boys achievement status was better than orphan girls in lower secondary school level compulsory mathematics.

- There was significance relation between orphan students' attitude towards mathematics and achievement in this subject.

  Bastola (2010), did a research on "A study of attitudes of Jalari students' and their teachers' towards mathematics in lower secondary level at Kaski district." For the study, 30 Jalari students (15 boys and 15 girls) were selected and 10 teachers from same schools were taken. Findings of the study were.

- The mean attitude score of Jalari boys was greater than the mean attitude score of Jalari girls.

- There was positive attitude of Jalari students towards mathematics.

- There was positive attitude of Jalari students' toward mathematics.

- There was not significant difference between Jalari boys' and girls' attitude toward mathematics.

- There was significant difference between Jalari students and their teachers' attitude toward mathematics.

- There was no significant relationship between Jalari students' attitudes towards mathematics and their achievement.

Above mentioned of all studies reported the attitudes of students and their parents towards mathematics and comparative study of boys and girls attitude and achievement in mathematics. But the study on attitude of blind students towards mathematics and its relationship with their achievement in lower secondary level has not been conducted in Nepal yet. So the researcher has attempted to study on this field.

CHAPTER III
RESEARCH METHODOLOGY

Before conducting a research the researcher must be sure about what he wants to do and how he achieves his objectives. A scientific way by which a researcher gets a systematic knowledge of a particular subject with case and effect is known as the methodology. Research methodology is a useful bridge to solve the research problems in a systematic way. Methodology is a very significant part of researcher. Under this part, different points have to be decided before conducting the research. It is decided before hand that what population and sample are to be taken, what tools and techniques are to be used, how data are to be obtained, analyzed and interpreted.

This chapter deals with methodology adopted, procedure followed in the selection of sample, development of tools, methods used for collecting data and analysis of the obtained data in detail.

3.1 Research Design

Research design is the conceptual structure within which research is conducted; it constitutes the blue print for the collection, measurement and analysis of data (Kothari, 1990). This study attempts to analyze the primary data as well as secondary data. Hence as for nature of the study both descriptive and analytical design have been followed to meet the objectives the study.

3.2 Population of the Study

A population in a research study is the group of subjects to which the results of the study are intended to apply. All blind students of lower secondary level of Amar Singh Higher Secondary School constituted the population of the study.

3.3 Sample of the Study

This study is based on population. All lower secondary blind students are also sample of this study because less number of students found in each class. There were 11, 12 and 5 students in class 7, 8 and 9 respectively.

3.4   Sources of Data

To fulfill the objectives of the study, primary as well as secondary data have been analyzed.

Primary Source: The required primary data are collected by questionnaire.

Secondary Source: The required secondary data are collected through the annual exam report 2066 B.S. of Shree Amar Singh Higher Secondary School.

3.5   Instruments

Attitude and achievement test were main instruments for the study of the researcher. Then the researcher developed the following instruments.

3.5.1   Achievement Test

Annual exam report 2066 B.S. of Shree Amar Singh Higher Secondary School was used for the student achievement score.

3.5.2   Attitude Test

To determine the attitude of blind students, attitude scale developed by George Levine was used which was provided with three categories responses like as agree, disagree and neutral with score 3, 1 and 2 respectively. First of all, fifty three positive statements were made under the guidance of the supervisor (shown in appendix A). These statements were related to different six areas like:

i) Teaching mathematics : consisting 10 questions.

ii) Place of mathematics in a society : consisting 8 questions.

iii) Teaching materials : consisting 10 questions.

iv) Difficulty of learning : consisting 8 questions.

v) Homework : consisting 8 questions.

vi) Habit of study of mathematics : consisting 9 questions.

Item analysis was performed for the final questionnaire.

3.5.3 Item Analysis

To get more reliability and validity of source of data, researcher used the following techniques to evaluate the questionnaire.

Each questions have been reviewed and carefully edited, they are subjected to a procedure called item analysis. Item analysis is a set of procedures, that is applied to know the indices for the truthfulness (or validity) of items. In other words, item analysis is a technique through which those items which are valid and suited to the purpose are selected and the rest are either eliminated or modified to suit the purpose.

27.5% of the students with the highest total scores and 27.5% of the students with the lowest total scores were taken for item analysis. Since the number of sample students taken for pilot study was only 8 students of Shree Janta Dhan Higher Secondary School of Baglung, the number of blind students in high and low groups was 2 each. It was assumed that these high group and low group were provided by $\overline{X}_1$ and $\overline{X}_2$ on which S.D. and Z value are calculated by using Appendix G, the criterion groups in terms of which the researcher could evaluate the individual statement. The table 1 represents the results of item analysis of tried out questionnaire.

Table 1 : Results of Item Analysis of Tried out Questionnaire

Item No.	Mean of		Z- value	Decision
	Higher Group $(\overline{X}_1)$	Lower Group $(\overline{X}_2)$		
1.	3	1	6.5	Selected
2.	2	3	-3.28	,,
3.	2.5	3	-1.65	,,
4.	3	2	4.04	,,
5.	2	2	0	Rejected
6.	2	3	-2.82	Selected
7.	3	3	0	Rejected
8.	2.5	2	1.65	Selected

9.	1.5	2	-2.02	,,
10.	3	3	0	Rejected
11.	3	3	0	,,
12.	3	2.5	4.28	Selected
13.	3	2	4.04	,,
14.	2	1	3.14	,,
15.	3	1	6.28	,,
16.	3	2	4.04	,,
17.	3	2	3.25	,,
18.	1.5	1.5	0	Rejected
19.	1.5	2.5	-3.40	Selected
20.	3	2.5	1.70	,,
21.	3	2.5	4.28	,,
22.	3	3	0	Rejected
23.	3	3	0	,,
24.	3	2	3.04	Selected
25.	3	3	0	Rejected
26.	2	2.5	-2.02	Selected
27.	3	2	4.04	,,
28.	2.5	3	-4.28	,,
29.	2	1	4.04	,,
30.	3	1.5	4.933	,,
31.	3	2.5	4.28	,,
32.	3	3	0	Rejected
33.	3	1.5	6.06	Selected
34.	1	1	0	Rejected

35.	2	3	-4.04	Selected
36.	2.5	3	-3.28	,,
37.	3	2.5	4.28	,,
38.	3	3	0	Rejected
39.	2	1	4.04	Selected
40.	2	1.5	1.52	Rejected
41.	3	2.5	4.28	Selected
42.	3	2	4.04	,,
43.	3	2.5	4.28	,,
44.	3	2.5	3.28	,,
45.	3	2	3.28	,,
46.	2.5	1.5	3.62	,,
47.	1	1.5	-4.28	,,
48.	3	2	4.28	,,
49.	2	1	4.28	,,
50.	3	2	3.32	,,
51.	3	3	0	Rejected
52.	3	3	0	,,
53.	3	2.5	3.28	Selected

3.5.4 Selection of Items for the Final Form

The Z-values for each of the items in the try-out questionnaire were found to measure the extent to which a given statement differentiated between high and low attitude groups. At 0.10 level 'Z' value equal to or greater than 1.645 was regarded as indicating that the average response of high and low groups to a statement differed significantly at 0.10 level when we had 2 students in each of high and low groups. It was found that 'Z' values were significant for thirty nine items and insignificant for 14

items. So only the thirty nine items whose 'Z' value were equal to 1.645 or more were selected for the final form of the scale. The item numbers 5,7,10,11,18,22,23,25,32, 34, 38,40,51 and 52 were rejected. All the selected 39 items were positive statements measuring attitudes of blind students towards mathematics.

3.5.5   Reliability of Attitude Scale

Reliability is one of the important characteristics of any test. In its simplest sense, reliability refers to the precision, or accuracy of the measurement or score. A well made scientific instrument should yield accurate results both at present as well as over time. In other words, such an instrument should give consistent results. Reliability refers to this consistency of scores or measurement which is reflected in the reproducibility of the scores when all other factors are held constant or some how controlled, a reliable test is one that produces, identical results for an examinee from one occasion to the other.

According to Anastari and Ubina (1997:85), reliability refers to "the consistency of scores obtained by the same individuals when re-examined with tests on different occasions or with different sets of equivalent items, or under other variable examining conditions.

For testing reliability, different methods are used. In this study split-half method was used to test the reliability of the attitude scale. A widely used method of testing the reliability of a test is split half method. In this method, a single test is given at a single sitting, and with a single time limit and separate scores is derived-one by scoring the odd numbered items and other by scoring the even numbered items. The correlation between these two sets of scores provides a measure of the accuracy with which the test is measuring the individual. The split-half reliability enables an investigator to determine whether the two halves of the test are measuring the some characteristics or not. After finding the correlation co-efficient of these two halves, it is set into the Spearman Brown prophecy formula to calculate the whole test reliability.

The scores of four students were split into two halves as mentioned above. Then the correlation coefficient between those two sets of scores was calculated and was found to be 0.84. The split half reliability of the whole test was found to be 0.91.

This result indicated that the entire scale measured of students' attitudes towards mathematics was quite accurate and the test had a high internal consistency. The table 2 shows the split half reliability of the test.

Table 2 : Split Half Reliability of the Test

Students	Odd (x)	Even (Y)	XY	X²	Y²
B	69	69	4761	4761	4761
C	72	66	4752	5184	4356
A	57	55	3135	3249	3025
F	60	63	3780	3600	3969
N=4	$\sum X = 258$	$\sum Y = 253$	$\sum XY = 16428$	$\sum X^2 = 16794$	$\sum Y^2 = 16111$

$$\text{Reliability of split half test } (r_{XY}) = \frac{N \sum XY - \sum X \sum Y}{\sqrt{N \sum X^2 - (\sum X)^2} \ \sqrt{N \sum Y^2 - (\sum Y)^2}}$$

$$= \frac{4 \times 16428 - 258 \times 253}{\sqrt{4 \times 16794 - (252)^2} \ \sqrt{4 \times 16111 - (253)^2}}$$

$$= \frac{438}{24.74 \times 20.86}$$

$$= 0.84$$

$$\text{Therefore, reliability of whole test } (r_{tt}) = \frac{2 r_{XY}}{1 + r_{XY}}$$

$$= \frac{2 \times 0.84}{1 + 0.84}$$

$$= 0.91$$

3.5.6 Validity of the Attitude Scale

The term "validity" means truth or fidelity. Thus, validity refers to the degree to which a test measures what it claims to measure.

Different writers have defined validity in different ways. For example, Anastasi (1968:99) has said, "the validity of a test concerns what the test measures and how well it does so". Lindquist (1951:213) has defined validity of a test as "the

accuracy with which it measures that which is intended to measure or as the degree to which it approaches infallibility in measuring what it purports to measure".

The researcher consulted with his supervisor and discussed every questions in reference to the objectives the study for the content validity of the test for this study.

Finally, by the help of supervisor and subject experts, some language modifications were done and some questions were changed. Then these final questionnaires (see appendix B) were applied to the sampled students.

3.6   Data Collection Procedure

Data is the foundation of any research. Therefore, collection of reliable data is very essential part of all types of research. For this study the researcher visited the Amar Singh Higher Secondary School to collect the data. First of all, researcher met the headmaster and mathematics teacher of this school and asked permission for the research work. By the use of questionnaire (see appendix B) the researcher took the attitude of blind students towards mathematics. Students being blind, the researcher explained all the thirty nine positive statement of the questionnaire to each student and their attitude was taken.

Annual exam result schedule of class six, seven and eight of 2066 B.S. was used for finding the students' achievement in compulsory mathematics. The researcher explained the questionnaire forms to twenty eight blind students of class seven, eight and nine. Among them 11 students were of class seven, 12 students were of class eight, and 5 students were of class nine. More over, some useful discussion were also held with current faculty staffs of blind section of Amar Singh Higher Secondary School to get more reliable information during the visit hours.

3.7   Scoring Procedure

There were 39 positive statements in the questionnaire. For each positive items 3, 2 and 1 scores were allotted for each agree, neutral and disagree responses. Theoretically, positive attitude had a maximum score of $39 \times 3 = 117$. So the maximum score of 117 indicates a perfectly positive attitude. And minimum score of 39 attitude indicates a perfectly negative attitude.

3.8   Statistical Techniques Used

The obtained data were analyzed with the help of following statistical computations:

i)   Percentage

ii)   Mean

iii) Standard deviation

iv)   Z-test

v)   Rank correlation test

CHAPTER - IV
ANALYSIS AND INTERPRETATION OF DATA

This chapter deals with the details of the results of the statistical analysis and their interpretation. In this chapter, the analysis and interpretations are followed in a systematic manner. The collected data were tabulated and analyzed for the study of attainment of objectives and verification of hypothesis as stated in previous chapter.

The data was collected from all the blind students of grade seven, eight and nine of Amar Singh Higher Secondary School. There were 39 positive statements for the six different areas such as: teaching mathematics, place of mathematics in society, teaching materials, difficulty of learning, writing home-work and habit of study of mathematics. For the achievement of the students, mark ledger of annual exam report was taken.

The obtained data was statistically analyzed and interpreted by using percentage, mean, standard deviation, Z-test and rank correlation test.

In order to present the analysis and interpretation systematically, this chapter has been divided into following sections:

a)   Blind students' attitude towards mathematics.

b)   Comparison of blind boys' and girls' attitude towards mathematics.

c)   Comparison of blind boys' and girls' achievement in mathematics.

d)   Relationship between blind students' attitude and their achievement in mathematics.

4.1   Blind Students' Attitude towards Mathematics

The first objective of the study was to determine the attitude of blind students towards mathematics.

In order to achieve this objective, the mean, standard deviation and percentage were computed. The obtained results are presented in the table 3.

Table 3 : Blind Students' Attitude towards Mathematics

N	Mean	SD	Percentage
28	99.82	7.57	85

The result in table 3 shows that the mean score of whole sample was found to be 99.82. This score is equivalent to nearly 85%, which clearly indicates strong positive attitude of blind students towards mathematics. The details process, how this table is formed is shown in appendix D.

Percentage of students for each 39 items are shown in appendix E. By analyzing of this appendix, percentage of blind students responses to attitude statements are given below in the table 4.

Table 4 : Blind Students' Responses to Attitude Statements

	Blind Students	Blind Boys	Blind Girls
Favourable Response	70%	78%	62%
Neutral Response	17%	12%	22%
Unfavourable Response	13%	10%	16%
Total	**100%**	**100%**	**100%**

The above table 4 shows that the majority of the students i.e. 70% were in favour of positive attitude towards mathematics and very few of them i.e. 13% expressed then unfavourability towards mathematics and nearly one sixth of students gave neutral response. The implication is that majority of blind students liked mathematics. The same table shows that majority of blind boys i.e. 78% and majority of blind girls i.e. 62% held positive attitude towards mathematics and minority of them showed their confusion and disfavour in this subject.

Now, mean attitude score, standard deviation and percentage in different aspects of mathematics are given in following tables.

4.1.1 Attitude towards Mathematics Teaching

Table 5 : Mean, Standard Deviation, Percentage of Attitude Score towards Mathematics Teaching

Area No.	Area of statements	Mean	Standard deviation	Percentage
1	Mathematics teaching	18.39	1.84	88

By analyzing above table, it implies that the mean attitude score of blind students towards mathematics teaching is 18.39 which is nearly equivalent to 88% which is more than 50%, which indicates that the attitude of blind students towards teaching mathematics is positive. The detail process, how this table is formed is shown in appendix D.

In this area of attitude consisted seven types of positive statements. Actually they were to find whether the mathematics teaching is effectiveness or not. By analyzing above table it can be concluded that mathematics teaching method was used on effective way.

Regarding the attitude of blind students towards teaching mathematics according to the responses given by respondents are concluded as below:

- Students get chance to ask question to their teachers.

- Mathematics teachers give alternative methods and hints to solve problem.

- Students are helped by teachers when they have some difficulties.

- Students are suggested properly after checking class work.

4.1.2 Attitude towards Place of Mathematics in Society

Table 6 : Mean, S.D. and Percentage of Attitude Score towards Place of Mathematics in Society

Area No.	Area of Statements	Mean	S.D.	Percentage
2	Place of mathematics in society	15.32	2.61	85

The above table shows that mean attitude score of "place of mathematics in society" is 15.32 which is equivalent to nearly 85%. It implies that the attitude of blind students towards it is positive. In this area of attitude consisted only six positive statements. By analyzing the above table it is clearly determined that the place of mathematics in society is very high. Hence, according to the responses on "place of mathematics in society" is concluded as below:

- Students are realized that to study science and other advanced technology mathematical knowledge is necessary.

- The value of mathematics is increasing day by day.

- Mathematics helps for the study of other subjects.

- To get most of jobs, mathematical knowledge is necessary.

4.1.3   Attitude towards Teaching Materials

Table 7 : Mean, S.D. and Percentage of Attitude Score towards Teaching Materials

Area No.	Area of Statements	Mean	S.D.	Percentage
3	Teaching materials	17.60	2.19	84

The above table shows that the mean attitude score of liking teaching materials" is 17.60 which is equivalent to nearly 84%. It implies that the attitude towards teaching materials is positive. In this area of attitude consisted seven positive statements. More than 50% students gave favourable responses for most of the positive statements. But for the positive statement "My mathematics teacher teaches us by using teaching materials", only 39% of students gave favourable responses. It implies that most of the teachers do not teach by using teaching materials. Hence according to students responses on teaching materials towards learning mathematics is concluded as below:

- Students are interested to learn mathematics by using teaching materials.

- They are interested to make teaching materials themself by the help of teacher.

- Students are convinced that teaching materials are necessary to learn concept, to start new topic, and for long lasting memory.

4.1.4   Attitude towards Difficulty of Learning

Table 8 : Mean, S.D., and percentage of attitude score toward difficulty of learning

Area No.	Area of Statements	Mean	S.D.	Percentage
4	Difficulty of learning	15.53	1.88	86

The above table shows that the mean attitude score about difficulty of learning is 15.53 which is equivalent to nearly 86%. It implies that attitude towards difficulty of learning is positive. In this area of attitude consisted six positive statements.

According to students' responses on difficulty of leaning mathematics is concluded as below:

- Anyone can learn mathematics if he/she is willing to study.

- They are convinced that every student can learn mathematics if it is properly taught.

- They feel easy to remember formula of mathematics.

4.1.5   Attitude towards Homework

Table 9 : Mean, SD and Percentage of Attitude Score towards Homework

Area No.	Area of Statements	Mean	S.D.	Percentage
5	Homework	16.42	1.34	91

The above table shows that the mean attitude score of blind students' attitude on 'Home-work' is 16.42 which is equivalent to nearly 91%. It implies that the attitude of students towards homework of mathematics is strongly positive. In this aspect there were six positive statements. According to the students' responses on "homework of mathematics" is concluded as below:

- They want to be busy on doing homework of mathematics.

- They become happy when their teachers give home-work.

- Almost every one knows that regular homework makes them perfect.

4.1.6 Attitude towards Habit of Study of Mathematics

Table 10 : Mean, S.D. and Percentage of Attitude Score towards Habit of the Study of Mathematics

Area No.	Area of Statements	Mean	S.D.	Percentage
6	Habit of the study of mathematics	16.5	2.62	78

The above table show that mean attitude score of "habit of study of mathematics" is 16.5 which is equivalent to nearly 78%. It implies that the attitude of blind students towards "habit of study of mathematics" is positive.

In this area of attitude consisted seven positive statements. More than 50% students gave favourable responses for all most all statements. But for the statement "Provided text book is enough for students of mathematics", only 14% of students gave favourable responses. It implies that blind students need other books than only one provided text book. And for the statement "It is better to increase number of periods of mathematics", only 43% of students gave favourable responses. It implies that more than 50% students don't want to increase the number of periods of mathematics.

According to their responses on "habit of study of mathematics" is concluded as below:

- Mathematics is more interested subject than other subjects.

- Students give more time to study mathematics.

4.2 Comparison of Blind Boys' and Girls' Attitude towards Mathematics

The second objective of the study was to compare blind boys' and girls' attitude towards mathematics. The hypothesis is: there is no significant difference between blind boys' and girls' attitude towards mathematics.

To test the hypothesis, the attitude score of blind boys and girls are shown in appendix C. The analysis procedure is shown in the following table.

Table 11 : Comparison of Blind boys' and Bind Girls' Attitude towards Mathematics

Group compared	N	Mean ($\overline{X}$)	S.D	Calculated Z-value	Tabulated Z-value at 0.05 level of significance
Boys	13	99.82	6.49	1.54	± 1.96
Girls	15	96.06	6.35		

The mean attitude score of 13 blind boys was 99.82 and their standard deviation was 6.49. Similarly the mean attitude score of blind girls was 96.06 and their standard deviation was 6.35. The computed Z-value in the table 11 lies between -1.96 to 1.96 at 0.05 level of significance. So, null hypothesis is accepted. So the computed Z-value is not significant at 0.05 level of significance. It shows that there is no significant difference in the attitudes of blind boys and blind girls.

4.3 Comparison of Mathematics Achievement of Blind Boys and Blind Girls

The third objective of the study was to compare blind boys' and girls' achievement in mathematics. In order to achieve this objective following hypothesis was formulated i.e. "there is no significance difference between blind boys and blind girls' achievement in mathematics. To verify this hypothesis, marks obtained by boys and girls are obtained from annual exam report which is shown in appendix C. The calculated values of mean, standard deviation and Z-value of achievement scores obtained by blind boys and blind girls are presented in the table 12.

Table 12 : Comparison of Blind Boys' and Girls' Achievement in Mathematics

Group compared	N	Mean ($\overline{X}$)	S.D	Calculated Z-value	Tabulated Z-value at 0.05 level of significance
Blind Boys	13	39.38	19.53	-0.68	± 1.96
Blind Girls	15	44.13	17.13		

Above table shows that the mean score of blind boys and girls are 39.38 and 44.13 respectively. The mean score of blind girls is higher than the mean score of blind boys by 4.75. The calculated Z-value is -0.68 which lies in between -1.96 to 1.96 of significance. Hence null hypothesis is accepted. Hence at 0.05 level of significance, there is no significance difference between blind boys and blind girls achievement in mathematics.

4.4 Relationship between Blind Students' Attitude and Achievement in Mathematics

To determine the relationship between attitude and achievement, the researcher used Karl Pearson's product movement method to compute the value of correlation coefficient (r). By using appendix C, attitude score of boys (X_1) were converted in hundred as achievement score in mathematics of boys (Y_1) were in hundred.

Table 13: Correlation between Blind boys Students' Attitude and Achievement in Mathematics

S.N.	Attitude Score X_1	Achievement Score Y_1	X_1^2	Y_1^2	X_1Y_1
1	92	35	8464	1225	3220
2	84	22	7056	484	1848
3	82	44	6724	1936	3608
4	77	31	5929	961	2387
5	87	28	7569	784	2436
6	97	9	9409	81	873
7	94	56	8836	3136	5264
8	86	50	7396	2500	4300
9	90	91	8100	8281	8190
10	88	19	7744	361	1672
11	91	41	8281	1681	3731
12	96	43	9216	1849	4128
13	94	43	8836	1849	4042
	$\sum X_1 = 1158$	$\sum Y_1 = 512$	$\sum X_1^2 = 103560$	$\sum Y_1^2 = 25128$	$\sum X_1Y_1 = 45699$

$$r_1 = \frac{N_1 \sum X_1Y_1 - (\sum X_1)(\sum Y_1)}{\sqrt{N_1 \sum X_1^2 - (\sum X_1)^2} \sqrt{N_1 \sum Y_1^2 - (\sum Y_1)^2}}$$

$$= \frac{13 \times 45699 - 1158 \times 512}{\sqrt{13 \times 103560 - (1158)^2} \sqrt{13 \times 25128 - (512)^2}}$$

$$= 0.06$$

Table 14: Correlation between Blind Girls Students' Attitude and Achievement in Mathematics

S.N.	Attitude Score X_2	Achievement Score Y_2	X^2_2	Y^2_2	X_2Y_2
1	73	42	5329	1764	3066
2	84	80	7056	6400	6720
3	90	20	8100	400	1800
4	79	33	6241	1089	2607
5	82	77	6724	5929	6314
6	94	35	8836	1225	3290
7	82	35	6724	1225	2870
8	84	50	7056	2500	4200
9	84	35	7056	1225	2940
10	83	24	6889	576	1992
11	78	38	6084	1444	2964
12	80	47	6400	2209	3760
13	76	64	5776	4096	4864
14	75	50	5625	2500	3750
15	88	35	7744	1225	3080
	$\sum X_2 = 1232$	$\sum Y_2 = 665$	$\sum X^2_2 = 101640$	$\sum Y^2_2 = 33807$	$\sum X_2Y_2 = 54207$

$$r_2 = \frac{N_2 \sum X_2 Y_2 - (\sum X_2)(\sum Y_2)}{\sqrt{N_2 \sum X_2^2 - (\sum X_2)^2} \ \sqrt{N_2 \sum Y_2^2 - (\sum Y_2)^2}}$$

$$= \frac{15 \times 54207 - 1232 \times 665}{\sqrt{15 \times 101640 - (1232)^2} \ \sqrt{15 \times 33807 - (665)^2}}$$

$$= -0.30$$

Correlation between Blind Students' Attitude and Achievement in Mathematics

Now,

$\sum X = \sum X_1 + \sum X_2 = 1158 + 1232 = 2390$

$\sum Y = \sum Y_1 + \sum Y_2 = 512 + 665 = 1177$

$\sum X^2 = \sum X^2_1 + \sum X^2_2 = 103560 + 101640 = 205200$

$\sum Y^2 = \sum Y^2_1 + \sum Y^2_2 = 25128 + 33807 = 58935$

$\sum XY = \sum X_1 Y_1 + \sum X_2 Y_2 = 45699 + 54207 = 99906$

$N = N_1 + N_2 = 13 + 15 = 28$

$$r = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{N \sum X^2 - (\sum X)^2} \ \sqrt{N \sum Y^2 - (\sum Y)^2}}$$

$$= \frac{28 \times 99906 - 2390 \times 1177}{\sqrt{28 \times 205200 - (2390)^2} \ \sqrt{28 \times 58935 - (1177)^2}}$$

$$= \frac{-15,662}{183.03 \times 51463}$$

$$= -0.17$$

The calculated value of r and its interpretation are as follows:

Table 15 : Correlation between Blind Students' Attitude and Achievement

Correlation between	N	Correlation Coefficient (r)	Relationship
Blind students' attitude and achievement	28	-0.17	Negligible
Blind boys' attitude and achievement	13	0.06	Negligible
Blind girls' attitude and achievement	15	-0.30	Low

Since the correlation coefficient between blind boys' attitude and achievement is 0.06, so we can conclude that there is negligible correlation between attitude and achievement.

Since the correlation coefficient between blind girls' attitude and achievement is -0.30. So we can conclude that there is low degree of negative correlation between attitude and achievement.

Finally, the correlation coefficient between all the blind students' attitude and achievement is -0.17, so we can conclude that there is negligible negative correlation between attitude and achievement.

Now to test the hypothesis, "There is no correlation between attitude and achievement", rank correlation method was used. For this spearman's rank correlation coefficient (r_s) was computed.

Table 16: To Test Hypothesis (Ho) : There is No Correlation between Attitude and Achievement

Attitude Score (X)	Achievement Score (Y)	Rank of Xi	Rank of Yi	d	d²
92	35	6	18	- 12	144
84	22	15.5	25	- 9.5	90.25
82	44	20	10	10	100
77	31	25	22	3	9

87	28	12	23	- 11	121
97	09	01	28	- 27	729
94	56	4	5	- 1	1
86	50	13	7	6	36
90	91	8.5	1	7.5	56.25
88	19	10.5	27	- 16.5	272.25
91	41	7	14	- 7	49
96	43	2	11.5	- 9.5	90.25
94	43	4	11.5	- 7.5	56.25
73	42	28	13	15	225
84	80	15.5	2	13.5	182.25
90	20	8.5	26	- 17.5	306.25
79	33	23	21	2	4
82	77	20	3	17	289
94	35	4	18	- 14	196
82	35	20	18	2	4
84	50	15.5	7	8.5	72.25
84	35	15.5	18	- 2.5	6.25
83	24	18	24	- 6	36
78	38	24	15	9	81
80	47	22	9	13	169
76	64	26	4	22	484
75	50	27	7	20	400
88	35	10.5	18	- 7.5	56.25

Here,

m = 3, o = 2, p = 2, q = 4, r = 3, s = 3, t = 2, u = 5

$$r_S = 1 - \frac{6\left[\sum d^2 + \frac{1}{12}(m^3 - m) + \frac{1}{12}(o^3 - o) + \frac{1}{12}(p^3 - p) + \frac{1}{12}(q^3 - q) + \frac{1}{12}(r^3 - r) + \frac{1}{12}(s^3 - s) + \frac{1}{12}(t^3 - t) + \frac{1}{12}(u^3 - u)\right]}{n(n^2 - 1)}$$

$$= 1 - \frac{6\left[4255.5 + \frac{24}{12} + \frac{6}{12} + \frac{6}{12} + \frac{60}{12} + \frac{24}{12} + \frac{24}{12} + \frac{6}{12} + \frac{120}{12}\right]}{28(28^2 - 1)}$$

$= -0.17$

From the table 16 the calculated value of r_s and its interpretation are as follows:

Table 17 : Correlation between Blind Students' Attitude and Achievement for Testing Hypothesis

Correlation between	N	Calculated rank Correlation Coefficient (r_s)	Critical value at 5% level of Significance
Blind students' attitude and achievement	28	-0.17	±0.377

The above table shows that the calculated rank correlation coefficient is -0.17 which is less than 0.377, so the null hypothesis is accepted at 0.05 level of significance. So we can conclude that there is no correlation between blind students' attitude and achievement in mathematics.

CHAPTER - V

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER STUDY

This chapter deals with the summary of the research, findings of the study, conclusion and points out suggestions and recommendation after having analyzed and interpreted the collected data.

5.1   Summary of the Study

This study was concerned with the attitude of blind students towards mathematics and its relationship with their achievement. Although mathematics has been given a significant position in the curricula of all the levels of school education, many students have not been able to succeed in mathematics. There may be several reasons behind this fact. The researcher, therefore, has tried to find out blind students' attitude (feeling) about mathematics. The attitudes of students are important factors for students' motivation for effective learning and teaching.

As already mentioned, this study was concerned with the attitude and achievement of blind students of lower secondary level at Amar Singh Higher Secondary School. The objectives of the study were:

i)   To determine the attitude of blind students towards mathematics.

ii)   To compare blind boys' and girls' attitude towards mathematics.

iii)   To compare the mathematics achievement of blind boys and blind girls.

iv)   To determine the relationship between attitude and achievement in mathematics.

For the study, researcher made 53 questions at first. Item analysis was made by taking eight blind students of Shree Janta Dhan Higher Secondary School of Baglung, Balewa. For the item analysis, reliability and validity test was performed. Only 39 positive statements were selected for final questionnaire.

To achieve the objectives, 28 blind students of Amar Singh Higher Secondary

School on lower secondary level was taken. The attitude of students providing three categories of rating scales were: i) agree ii) neutral iii) disagree. The rating scores of these scales were 3,2,1 in favour of favourable, neutral and unfavourable response. For the students' achievement in compulsory mathematics, the researcher used mark ledger of annual exam of related students.

The score of students were analyzed by using percentage, mean, standard deviation, Z-test and rank correlation test.

5.2   Findings of the Study

Statistical analysis and interpretation of the obtained data yielded the following results as the findings of the study:

i)   Blind students had strong positive attitude towards mathematics. Attitude towards teaching mathematics, attitude towards place of mathematics in society, attitude towards teaching materials, attitude towards difficulty of learning, attitude towards homework and attitude towards habit of the study of mathematics were found positive.

ii)   The mean attitude score of boys was 99.82 and their standard deviation was 6.49. Similarly, the mean attitude score of blind girls was 96.06 and their standard deviation was 6.35. It was found that there is no significant difference in the attitudes of blind boys and blind girls at 0.05 level of significance.

iii)   The mean achievement score of blind boys and girls was 39.38 and 44.13 respectively. The mean score of blind girls was higher than the mean score of blind boys by 4.75. And it was found that there is no significant difference between blind boys and blind girls achievement in compulsory mathematics in lower secondary level at 0.05 level of significance.

iv)   There was no correlation between blind students' attitude and achievement in mathematics.

5.3   Conclusions

On the basis of analysis, the following conclusions were drawn about the attitude of blind students towards mathematics with achievement of the students.

i)   Blind students had strong positive attitude towards mathematics.

ii)   There was no significant difference in the attitudes of blind boys and blind girls.

iii)   The mean achievement of girls was better than the mean achievement of boys but it was not a significant difference.

iv)   There was no correlation between attitude and achievement of blind students.

5.4   Recommendations for Further Study

The researcher felt that the following suggestions would be valuable for the researchers in their further researches in the field.

i)   This study was conducted to study the attitudes of blind students towards mathematics only. This study can be extended to study the attitudes of blind students towards different subjects also.

ii)   The area of this study was only the Amar Singh Higher Secondary School. It should be replicated in other schools of Nepal as well.

iii)   The sample of this study was consisted only the students learning in lower secondary level of Amar Singh H.S.S. of Kaski district. This study should be extended on a wider sample taking all types of such schools of the country.

iv)   Further study should be done on the topic comparison on blinds and other students' attitude towards mathematics.

v)   Similar study should be conducted for other grades as well as levels of schooling.

vi)   Further research should be carried out on problem faced by the blind students in learning compulsory mathematics.

vii)   It would be worthwhile to study the influence of parental attitude, home environment and physical facilities towards mathematics provided in the school which appear to be largely responsible for student's attitude and achievement.

viii)   A study should be carried on identifying the factors why blind students' achievement level is lower than other non-blinds students.

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Questionnaire for Pilot Test

A.   Attitude towards teaching mathematics

S.N.	Statement	Agree	Disagree	Neutral
1.	My mathematics teacher gives us chance to ask question after he has given an explanation.			
2.	My mathematics teacher shows alternative methods to solve the single problem.			
3.	My mathematics teacher gives us hints to solve the problem.			
4.	My mathematics teacher helps us when we have some difficulties to solve the problem.			
5.	My mathematics teacher encourages us to find several different methods for solving a particular problem.			
6.	My mathematics teachers expects from us to learn how to solve problems by ourselves.			
7.	My mathematics teacher suggests us properly after checking class work.			
8.	I can solve problems by using any methods other than teacher's method.			
9.	I can solve problems by using any methods other than teacher's methods.			
10.	My mathematics teacher wants us to discover mathematics principles and ideas for ourselves.			

B. **Attitude towards the place of mathematics in society**

S.N.	Statement	Agree	Disagree	Neutral
11.	Mathematics is useful to solve the problems of daily life.			
12.	To study science and other advanced technology mathematical knowledge is necessary.			
13.	The value of mathematics is increasing day by day.			
14.	Mathematics helps for the study of other subjects.			
15.	In near future most jobs will require knowledge of advanced mathematics.			
16.	Mathematics is necessary for the development of the country.			
17.	Mathematics is necessary to be a scientist.			
18.	Mathematics plays great role in our life than the other subjects.			

C. **Attitude towards teaching materials**

S.N.	Statement	Agree	Disagree	Neutral
19.	My mathematics teacher teaches us by using teaching materials.			
20.	Teaching materials is important to start new topic.			
21.	Teaching materials are necessary to teach the concept of mathematics.			
22.	Mathematical concept getting from teaching materials is long lasting.			
23.	It gives behavioural knowledge by using teaching materials.			

S.N.	Statement			
24.	I want to make teaching materials myself by the help of teacher.			
25.	I like class when my mathematics teacher teaches us by using teaching materials.			
26.	My mathematics teacher shows the teaching materials at proper time.			
27.	Some lessons can be understood by explanation than by using teaching materials.			
28.	If I don't understand the lessons even on repeating many times, teaching material will help me to remember.			

D. Attitude about difficulty of learning

S.N.	Statement	Agree	Disagree	Neutral
29.	Any one can learn mathematics			
30.	Almost anyone can learn mathematics if she/he is willing to study.			
31.	Almost all pupils can learn complex mathematics if it is properly taught.			
32.	Any student can learn mathematics as if more time has been given for practice.			
33.	Even complex mathematics can be made understandable to every high school pupil.			
34.	Mathematics is easy subject than other subject.			
35.	It is easy to remember formula of mathematics.			
36.	Any person of average intelligence can learn and understand mathematics.			

E.   Attitude towards homework

S.N.	Statement	Agree	Disagree	Neutral
37.	I become so happy when my teacher gives me homework.			
38.	I always do my homework.			
39.	First of all, I write homework of mathematics.			
40.	To solve the problems of mathematics is more interested than other.			
41.	I become so happy when my teacher checks homework.			
42.	I don't know the passing time when I am busy to do my homework.			
43.	Regular home-work makes us perfect.			
44.	I feel better when my teacher gives that class work as repeat homework again.			

F.   Attitude towards habit of study of mathematics

S.N.	Statement	Agree	Disagree	Neutral
45.	Mathematics class is more interesting than other subjects' class.			
46.	I give more time to study mathematics.			
47.	Provided text book is enough for students of mathematics.			
48.	I want to collect more and more reference books about mathematics.			
49.	It is better to increase number of periods of mathematics in school.			

50.	I give more priority in mathematics.			
51.	I repeat the mathematical tasks at home which are learnt in the classroom.			
52.	I also try to solve the similar problems that we are leant in class.			
53.	If I get a new mathematical, problem, I always try to solve that problem immediately.			

Dear students,

I am going to conduct a study on the topic **Attitude of Blind Students towards Mathematics and its Relationship with their Achievement in Lower Secondary Level at Amar Singh Higher Secondary School** for my Master Degree of Education. So, I have tried to know your attitude about compulsory mathematics with your valuable help. There are 39 positive statements concerned with attitude. There is no right or wrong answer. The right answer is your own opinion or feeling. I will explain all these statements and I hope you will say your opinion, then I will tick in your response.

Name of Student:............   Date :..........

School's Name:...............   Class:.........

                                      Roll No.:.............

A. Attitude towards teaching mathematics

S.N.	Statement	Agree	Disagree	Neutral
1.	My mathematics teacher gives us chance to ask question after he has given an explanation.			
2.	My mathematics teacher shows alternative methods to solve the single problem.			
3.	My mathematics teacher gives us hints to solve the problem.			
4.	My mathematics teacher helps us when we have some difficulties to solve the problem.			
5.	My mathematics teachers expects from us to learn how to solve problems by ourselves.			

S.N.	Statement			
6.	My mathematics teacher suggests us properly after checking class work.			
7.	I can solve problems by using any methods other than teacher's method.			

B. Attitude towards the place of mathematics in society

S.N.	Statement	Agree	Disagree	Neutral
8.	To study science and other advanced technology mathematical knowledge is necessary.			
9.	The value of mathematics is increasing day by day.			
10.	Mathematics helps for the study of other subjects.			
11.	In near future most jobs will require knowledge of advanced mathematics.			
12.	Mathematics is necessary for the development of the country.			
13.	Mathematics is necessary to be a scientist.			

C. Attitude towards teaching materials

S.N.	Statement	Agree	Disagree	Neutral
14.	My mathematics teacher teaches us by using teaching materials.			
15.	Teaching materials is important to start new topic.			
16.	Teaching materials are necessary to teach the concept of mathematics.			
17.	I want to make teaching materials myself by the help of teacher.			

S.N.	Statement	Agree	Disagree	Neutral
18.	My mathematics teacher shows the teaching materials at proper time.			
19.	Some lessons can be understood by explanation than by using teaching materials.			
20.	If I don't understand the lessons even on repeating many times, teaching material will help me to remember.			

D. Attitude about difficulty of learning

S.N.	Statement	Agree	Disagree	Neutral
21.	Any one can learn mathematics.			
22.	Almost anyone can learn mathematics if she/he is willing to study.			
23.	Almost all pupils can learn complex mathematics if it is properly taught.			
24.	Even complex mathematics can be made understandable to every high school pupil.			
25.	It is easy to remember formula of mathematics.			
26.	Any person of average intelligence can learn and understand mathematics.			

E. Attitude towards homework

S.N.	Statement	Agree	Disagree	Neutral
27.	I become so happy when my teacher gives me homework.			
28.	First of all, I write homework of mathematics.			
29.	I become so happy when my teacher checks homework.			

S.N.	Statement			
30.	I don't know the passing time when I am busy to do my homework.			
31.	Regular home-work makes us perfect.			
32.	I feel better when my teacher gives that class work as repeat homework again.			

F. Attitude towards habit of study of mathematics

S.N.	Statement	Agree	Disagree	Neutral
33.	Mathematics class is more interesting than other subjects' class.			
34.	I give more time to study mathematics.			
35.	Provided text book is enough for students of mathematics.			
36.	I want to collect more and more reference books about mathematics.			
37.	It is better to increase number of periods of mathematics in school.			
38.	I give more priority in mathematics.			
39.	If I get a new mathematical problem, I always try to solve that problem immediately.			

APPENDIX - C

Marks obtained by 13 boys :

35, 22, 44, 31, 28, 09, 56, 50, 91, 19, 41, 43, 43

Marks obtained by 15 girls :

42, 80, 20, 30, 77, 35, 35, 50, 35, 24, 38, 47, 64, 50, 38

Girls' Attitude Score:

96, 105, 103, 98, 92, 96, 85, 91, 98, 94, 98, 88, 90, 110, 97

Boys' Attitude Score :

96, 105, 103, 113, 106, 110, 101, 108, 112, 102, 98, 110, 90

APPENDIX - D

Process of making table No. 3

Attitude score of 28 blind students are:

96, 105, 103, 98, 92, 96, 85, 91, 98, 94, 98, 88, 90, 110, 97, 96, 105, 103, 113, 106, 110, 101, 108, 112, 102, 98, 110, 90

Here, total number of blind students (N) = 28

$\therefore$ Mean attitude score $(\overline{X}) = \dfrac{\Sigma X}{N} = \dfrac{2795}{28} = 99.82$

This mean attitude score is out of 117 score, as there are 39 positive statements. So positive attitude had a maximum score of 39×3 i.e. 117.

$\therefore$ Percentage of score $= \dfrac{99.82}{117} \times 100\%$, which is nearly equal to 85%.

Standard deviation (S.D.) can easily be calculated by using calculator.

Process of making table No. 5

The area "teaching mathematics" consists of 7 positive statements with maximum score of 7×3 i.e. 21.

Attitude scores towards teaching mathematics are:

19, 20, 17, 18, 21, 19, 18, 20, 19, 20, 17, 21, 17, 17, 21, 17, 17, 15, 19, 19, 17, 13, 18, 19, 20, 20, 20, 17

By using calculator, mean attitude score = 18.39 and standard deviation = 1.84

$\therefore$ Percentage of score $= \dfrac{18.39}{21} \times 100\%$, which is equivalent to 88%.

Attitude Scores of Students in Percentage

Item	% of students			% of Boys			% of Girls		
	F	**U**	**N**	**F**	**U**	**N**	**F**	**U**	**N**
1	96	4	0	92	8	0	100	0	0
2	82	11	7	84	8	8	80	13	7
3	96	0	4	100	0	0	93	0	7
4	93	0	7	92	0	8	93	0	7
5	68	18	14	77	8	15	60	27	13
6	75	7	18	77	0	23	73	13	14
7	18	50	32	31	38	31	7	60	33
8	86	7	7	92	8	0	80	7	13
9	75	7	18	92	0	8	60	13	27
10	64	7	29	61	8	31	67	7	26
11	68	21	11	77	15	8	60	27	13
12	50	14	36	77	15	8	27	13	60
13	54	7	39	77	15	8	33	0	67
14	39	39	22	46	39	15	33	40	27
15	82	4	14	92	0	8	73	7	20
16	100	0	0	100	0	0	100	0	0
17	61	25	14	77	15	8	47	33	20
18	46	36	18	53	39	8	47	33	20
19	79	14	7	92	0	8	67	26	7
20	86	11	3	85	15	0	87	6	7
21	61	28	11	69	31	0	53	27	20

22	89	7	4	92	0	8	87	13	0
23	75	4	21	85	0	15	67	7	26
24	75	7	18	92	0	8	53	20	27
25	72	14	14	69	31	0	80	0	20
26	50	4	46	69	0	31	33	7	60
27	86	0	14	92	0	8	80	0	20
28	50	7	43	53	8	39	47	7	46
29	89	0	11	92	0	8	87	0	13
30	89	4	7	92	0	8	87	6	7
31	86	3	11	77	8	15	93	0	7
32	68	11	21	77	8	15	60	13	27
33	61	11	28	77	8	15	47	13	40
34	57	7	36	77	0	23	40	13	47
35	14	61	25	15	54	31	13	67	20
36	79	14	7	100	0	0	60	27	13
37	43	39	18	62	23	15	27	53	20
38	64	14	22	84	8	8	47	20	33
39	82	0	18	85	0	15	80	0	20

1. **Attitude Score towards Teaching Mathematics**

   19, 20, 17, 18, 21, 19, 18, 20, 19, 20, 17, 21, 17, 17, 21, 17, 17, 15, 19, 19, 17, 13, 18, 19, 20, 20, 20, 17

2. **Attitude Score towards the Place of Mathematics in Society**

   8, 18, 13, 18, 18, 17, 17, 16, 15, 17, 18, 18, 17, 18, 16, 10, 15, 18, 13, 13, 16, 15, 14, 12, 13, 18, 15, 13

3. **Attitude Score towards Teaching Materials**

   15, 20, 21, 16, 19, 15, 17, 21, 19, 21, 21, 15, 17, 19, 19, 16, 13, 17, 18, 18, 16, 15, 19, 16, 18, 17, 20, 15

4. **Attitude Score towards Difficulty of Learning**

   15, 15, 18, 16, 18, 18, 15, 16, 16, 18, 16, 16, 13, 18, 18, 17, 10, 13, 15, 16, 15, 14, 16, 14, 14, 14, 14, 17

5. **Attitude Score towards Homework**

   16, 18, 12, 16, 17, 18, 15, 18, 18, 18, 16, 18, 16, 16, 18, 16, 17, 17, 16, 16, 14, 14, 16, 17, 16, 17, 17, 17

6. **Attitude Score towards Habit of Study of Mathematics**

   17, 19, 17, 18, 19, 21, 19, 19, 19, 19, 15, 17, 16, 9, 18, 13, 16, 18, 13, 16, 13, 14, 13, 14, 17, 17, 19, 17

Statistical Formulas

1. Mean $(\bar{X}) = \dfrac{\Sigma X}{N}$

2. Standard deviation $(\sigma) = \sqrt{\dfrac{\Sigma d^2}{N} - \left(\dfrac{\Sigma d}{N}\right)^2}$

3. $Z = \dfrac{\bar{X}_1 - \bar{X}_2}{\sqrt{\dfrac{\dagger_1^2}{n_1} + \dfrac{\dagger_2^2}{n_2}}}$

4. Reliability of split half test $(r_{XY}) = \dfrac{N \Sigma XY - \Sigma X \Sigma Y}{\sqrt{N \Sigma X^2 - (\Sigma X)^2} \ \sqrt{N \Sigma Y^2 - (\Sigma Y)^2}}$

5. Reliability of whole test $(r_{tt}) = \dfrac{2r_{XY}}{1 + r_{XY}}$

6. Correlation coefficient $(r) = \dfrac{N \Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{N \Sigma X^2 - (\Sigma X)^2} \ \sqrt{N \Sigma Y^2 - (\Sigma Y)^2}}$

7. Rank correlation coefficient $(r_S) = 1 - \dfrac{6\Sigma d^2}{n(n^2 - 1)}$

Interpretation of a Correlation Coefficient

Coefficient (r)	Relationship
.00 to .20	Negligible
.20 to .40	Low
.40 to .60	Moderate
.60 to .80	Substantial
.80 to 1.00	High to very high

Source : Best and Khan, p. 308