

Chapter I

INTRODUCTION

Background of the Study

In primary school time, I used to think that mathematics is a body of numbers including four basic operations (addition, subtraction, multiplication and division). When I became a student of secondary level, I realized that mathematics is more than numbers with operations. Being a student of university level, I started to think that it is a very difficult task to define mathematics. Procter (1995, p. 7) defines mathematics as “the study of numbers, shapes and space using reason and usually a special system of symbols and rules for organizing them”. Sharma (2001 as cited in Ghimire, 2006) says that mathematics is a key “Gate Keeper” to further education and employment opportunities but many students are leaving school with poor functional skills in mathematics and frequently require support in acquiring mathematical competence after they leave school.

Mathematics is the backbone of education and one of the fundamental components of literacy. Researches have shown that it is a gateway and a “critical filter” to students for further study and employment. Mathematics is essential for understanding every discipline. Mathematics plays a vital role in developing human resources. Mathematics is the foundation of almost all of the subjects. In absence of mathematical knowledge, it is very difficult to understand and cope with other disciplines like economics, physics, chemistry and other formal and informal paradigms. Mathematics is applicable in every steps of human society, from starting to the end of the life.

The academic achievement in any subject is the acquired ability or the degree of competence in school tasks generally measured by standardized tests and expressed in percentage or grade units based on norms derived from a wide sampling of pupil's performance. Academic achievement is referred to as the degree or level of success or proficiency attained in

some specific area concerning scholastic and academic work. The achievement further can be defined as something that we have done successfully, especially through hard work or skills. Biswas and Agrawal (1971) further state “Academic achievement is the knowledge attained and skill developed in the academic subjects that are usually designated by test scores” (p. 156).

It is not possible to measure intelligence and efficiency of a student directly. So we use indirect measurement. We use test score as a means to measure intelligence and efficiency of a student. The test score usually designates knowledge and skill developed during school education. Therefore, “The marks obtained by students are considered as the academic achievement” (Good, 1959). Achievement has been regarded as a very important indicator to judge the quality of education. Students always expect to gain higher achievement. The achievement of the students is a powerful entrance for any job and other opportunities.

UNESCO conducted the National Assessment of school Achievement (NASA, 2013) in three subjects’ science, mathematics and social studies of grade eight students from the 25 districts of Nepal. And found that average mathematics achievement is decreased by 8% than National Assessment of school Achievement 2011.

It is a great concern of matter that why the achievement of the students in Mathematics is very low. The achievement of the students is not independent of themselves and their abilities too. The achievement of the students may be affected from various factors. Bajracharya (2007) observed that “the main factors are students related factors, teacher related factors and parents related factors” (p.78). CERID (1984) found that the poor situation in mathematics of lower achievement level is influenced by several co-related variables. Achievement as such is essentially determined by different variables. Those variables are mainly the student related variables, school related variables, and teacher related variables and household related variables.

The achievement of the children in mathematics also significantly varies by ethnicity, gender, location of the school, parents' economic status, socio-culture, education background and occupation of the parents (Neupane, 2001). The Third International Mathematics and Science Study [TIMSS] (2003) explained that the students' home environment, attitudes towards mathematics, mathematics curriculum, instructional contexts, practices and school related factors are the significant categorical variables in students' achievement.

Bajracharya (2007) states the students' related factors are one of the major factors among various factors that affect on students' achievement. Student related factors are those which are related to that individual. It varies from person to person. Although there are many students' personal variables, the researchers have chosen different variables in different studies. Gender, age, hours of watching TV at home, regularity and punctuality in attending school, hour spent at home study, taking private tuition, language spoken at home, availability of reference materials at home and time taken in reaching school are some of the major and common personal factors which had been focused in several studies. Bajracharya (2007) has taken age, gender, prior achievement, peer group interaction and attendance as student related variables. According to Ghimire (2006), the major personal factors consist: gender, age, mother tongue, language of instruction in classroom, peer interaction in studies, residence, watching television, participation in games/sports, helping to parents in house hold work and time spent at home in math practice.

Most researches on the effect of time spent on home work by the students have been conducted at the secondary school level. Morimore and Outson (1979) included three items about homework. They reported that assignment of the homework by the students and doing homework by the students was positively associated with students' achievement and their behaviors.

The language of instruction in classroom is also one of the causes affecting students' achievement in mathematics. Third International Mathematics and Science Study [TIMSS] (1995) conducted a research and concluded that South African pupils were performing low achievement in mathematics and science. However, there were significant language and communication problems with South African pupils learning mathematics as a second language. Pupils in all three grades (7, 8 and 12) showed a lack of understanding of both mathematics questions, and an inability to communicate their answers in instances where they did understand the questions. Pupils performed particularly badly in questions requiring a written answer.

Stingler and Hiebert (1999) analyzed TIMSS videotapes of math instruction by teachers from the U.S. and Japan and discovered an interesting “teaching gap” in math instruction. It was found that students in an American math classroom spent most of their time acquiring isolated skills through repeated practice, whereas students in a Japanese classroom devoted as much time to solving challenging problems and discussing mathematical concepts as they did practicing skills. This difference may be embedded in the different “cultural scripts” concerning the nature of math, nature of learning and role of the teacher in the two countries. In the U.S., where math is perceived more as a set of procedures for solving problems, American teachers focus more on procedural skills and ask their students to practice many times in order to master the skills. It showed that there was a relationship between the time spent at home or at school on math study and students' achievement in mathematics.

Most of the students spent more time on television in these days. The television programs are more enjoyable rather than knowledge. In this regard, Students who spent more time on watching television at home have shown low performance in mathematics (Ghimire,2006). The study concluded that there was association between the number of hours watching TV and students' achievement in mathematics.

Every society expects good academic result from the school. The policy makers in the field of education and educationist show their interest on the evaluation of educational achievement. Bosker and Shreen (1989) suggested that the educational scientists seek to determine the reasons for the variation in achievement across different systems. The researchers are interested to find out the causes of achievement within the country. The main questions to be answered by the researchers are likely on; what are the factors that are having either positive or negative influences on achievement and what strategies can be implemented to improve outcomes?

The achievement in mathematics at lower secondary level especially with regard to grade eight students is a matter of particular concern for the researcher. There could be many factors that may affect the students' achievement in mathematics at lower secondary level, especially in grade eight. Among many factors, this study intended to found whether there is significant difference in math achievement and the personal factors of the students. The hypothesis was administered at the first stage aftertaking the information accordingly students' personal factors and their achievement score with the help of quantitative data.

Statement of the Problem

Lower Secondary Level is a transitional educational phase from primary to secondary level. The major function of Lower Secondary education is to prepare the students for pursuing the secondary education. The low achievement in mathematics; especially in Lower Secondary Level which is the foundation of secondary level is a great matter of concern for all stakeholders; students, their parents, teachers, educational exports and government sectors concerned with this field. There are various factors that affect students' achievement. Among them, personal factors of the students are one of them. The problems considered to checking the significant difference in math achievement and the personal factors of the students;

Therefore, the problem statement of this study is: What is the significant difference in mathematics achievement and the personal factors of the students?

Objectives of the Study

The objective of this study was to analyze the mathematics achievement of the students with respect to different personal factors (gender, time hour on watching TV and time hour on studying mathematics at home)

Research Questions

This research was focused to answer the following research questions:

-) Does the gender of the students play the significant role in the achievement of mathematics?
-) Does the student's time hour on watching TV at home play the significant role in the achievement of mathematics?
-) Does the student's time hour on studying mathematics at home play the significant role in the achievement of mathematics?

Significance of the Study

This study analyzed the significant difference between the achievement in mathematics and the personal factors of the students. It is expected that the findings of the study will help the teachers to know about the effect of personal factors on achievement so that the teachers may treat the students accordingly to increase the achievement. It will also be a helpful document to the parents who are worry by the performance of their children in mathematics. All individuals are different. They have different personal behaviors and values which influence on their achievement. So, this document will help to school administrators to create the learning environment according to the personal factors of the students. Moreover, research findings would be a valuable and informative document to head teachers, text books

writers, educational planners, and educational researchers as well as to other related persons and organizations associated to school education.

Research Hypothesis

The researcher tested the following hypothesizes to address the research questions of the study as mentioned above.

-) There is statistically significance difference between the mean mathematics achievements according to gender of the student.
-) There is statistically significance difference between the mean mathematics achievements according to time hour on watching TV.
-) There is statistically significant difference between the mean mathematics achievements according to time hour on studying mathematics at home.

Delimitations of the Study

There are several factors affected the achievement of the students. Due to the short 2 month time of period, the researcher has selected only personal factors among various factors (Gender of the student, Study hour on watching television and Time hour on studying mathematics at home), which may directly or indirectly relate on students' achievement. He selected the schools of Kaski District of 2015. Because of the selection of only personal factors, the result of this study cannot be generalized.

Definition of Terms

Achievement

The achievement in this study is defined in terms of the scores obtained by the students in Mathematics Achievement Test [MAT] conducted with standardized questions.

Students' Personal Factors (Variables)

In this study, students' personal factors consist: gender, time hours on watching television and time hour on studying mathematics at home.

Public Schools and Private Schools

The schools financed and managed by the government are public schools where as the schools financed and managed by the private sectors are private schools.

Urban Schools and Rural Schools

The schools, which are situated in Pokhara valley, are taken as urban schools, where as the schools which are situated in outside the Pokhara valley of Kaski district are considered as rural schools.

Time Hour on Watching Television

It is defined as time in hours on an average per day that a student spends on watching the programmes on television.

Time Hour on Studying Mathematics at Home

It is defined as time in hours on an average per day that a student spends on learning mathematics at home either doing homework or practicing the problem

Chapter II

REVIEW OF LITERATURE

In this chapter, the researcher reviewed the literatures on the following sections.

a) Achievement in mathematics of different grades b) personal factors of the students and their achievement in mathematics.

The researcher first reviewed the achievement status of the students in mathematics of different grades, and then reviewed the literatures related to the factors influencing to the students' achievement in mathematics and finally reviewed the literatures on personal factors of the students and their achievement on mathematics.

Achievement in Mathematics of Different Grades in Nepal

Achievement is something that succeeds in doing, usually with effort. It is an act or a process of finishing something successfully. From the point of sociology, achievement is a social status gained through personal merit rather than as a result of the circumstances into which somebody is born. The learning outcomes developed by the concern institutions are the achievement of the students after the completion of certain standard. There are many aspects of achievement. Among them, academic achievement has always been a major and centre theme of every educational institution. Ghimire (2006) states that the academic achievement is referred to as a degree or level of success or proficiency attained in some specific area concerning scholastic and academic work. Setia (1991) defines the degree of competent in school tasks generally measured by standardized tests and expressed in percentage or grade unit based on norms derived from a wide sampling of pupil's performance.

Several researchers have been conducted on achievement in mathematics in Nepal. Now, some of the studies have been reviewed here. Basic and Primary Education Project [BPEP] (1979) conducted the study "The Effect of New Curriculum on the Achievement of

Grade Four Students". This study revealed that the mathematics achievement was 28%. Furthermore, BPEP (1989) studied on the effect of new curriculum on the achievement of grade five students and concluded that the mean mathematics achievement was 26.58%.

CERID (1985) conducted a study among the grade five students and identified that the majority of students secured less than 45% marks in mathematics. New Era (1995) conducted the study "Basic and Primary Educational Project Achievement Study". Achievement test conducted so far was based on mathematics curriculum of grade three. The mean score of achievement of grade three calculated as 15.24 out of 40 full marks in mathematics.

SEDP (1999) conducted the research on lower secondary children and concluded that the mean and SD of achievement scores of grade eight students in mathematics were 28.87 and 19.63 respectively. The mean and SD in mathematics of grade eight students of centre region were 32.35 and 21.56 respectively. It also showed that there was poor achievement level in mathematics.

Educational Development Service Centre [EDSC] (1999) conducted a research on "National Assessment of Grade Five Students" in Mathematics, Nepali and Social Studies. The overall mean performance in mathematics was 27.25 and the SD was 17.08. The mean achievement of the students in mathematics in the centre development region was 30.09. The mean score of the students of rural and urban location were as 27.30 and 27.08 respectively. Similarly, the mean score of boys and girls were as 29.56 and 24.64 respectively. The achievement of private and public school students of Kathmandu valley was 42.12 and 39.29 respectively.

ESDC (2001) conducted a study on "National Assessment of Grade Three Students" aiming to determine the factors contributing to the students' achievement of the learning outcomes, to assess the performance of grade three students in Mathematics, Science and Social studies. In this study, 3534 students from 171 schools participated in the achievement test

from 23 different districts. 498 subject teachers and 171 head teachers were also included. The mean achievement scores in mathematics were 47 and standard deviation was 23.20. It showed that there was a small improvement against the achievement level determined by the year 1997 study. In the year 1997, the achievement was 43.81 in mathematics.

UNESCO conducted the National Assessment of school Achievement (NASA, 2013) in three different subjects mathematics, science and social studies of the grade eight student from the 28 districts of Nepal and found the average achievement in mathematic was 40% which was decreased by the 10% than National Assessment of school Achievement 2011.

Personal Factors of the Students and Achievement in Mathematics

There are various researches conducted on personal factors of the students and its influence on the achievement of mathematics. Various students' factors are related to learning. These variables include gender, age, and availability for TV at home, regularity and punctuality in attending school, hours spent on study at home, taking private tuition, language spoken at home, availability of reference materials at home and time taken in reaching school (Mirza&Iqbal as cited in Khanal, 2005). CERID (1999) conducted a study on Assessment of Learning Achievement of Lower Secondary Level Students. It mainly deals with the performance of students measured through achievement test and competent analysis of students' performance and factors attributing to school achievement. This research analyzed various factors including the personal factors of the students such as age, sex, language spoken at home and working hours at home. He concluded that such personal factors have remarkable influence on achievement.

Although there are many personal factors of the students, different researchers have chosen different personal factors in their studies. In this study, the researcher selected only four personal factors of the students. They are: gender, language spoken at home, number of hours watching television and time spent on mathematics at home. In this section, I review

relevant literatures related to those four selected personal factors and achievement in mathematics.

Several researchers have focused for the gender of the students and its' effect on math achievement. Most of the researchers found there are significant differences on math achievement due to gender. Some researchers also found that there are no any differences on math achievement and the gender of the students.

The first International Association for the Evaluation of Educational Achievement [IAEA] had implemented mathematics study project in different countries and found that gender was related to mathematics achievement in almost all countries; the boys scoring higher than girls (NCTM, 1992).

CERID (1998) concluded that the achievement of private and public school students are evident in grade five and grade eight. The students' achievement of private schools was significantly higher than public school students. The study on students' achievement in Lower Secondary Level, which was jointly conducted by CERID and Secondary Educational Development Project (SEDP), reveals that the mean score of mathematics achievement was 28.87 (CERID, 1999)

Mohammad (1999) conducted a research on Achievement in Mathematics by sex of grade eight students. This study was limited to private and public schools situated in Parsa district. The difference between mean scores obtained by girls and boys was statistically significant. Similarly, Bajracharya (1999) pursued a research related to mathematics achievement among the students of grade V in selected schools in Kaski district. The research conducted on achievement in mathematics among the fifth grade students in selected schools of Kaski district. It concluded that sex difference affected achievement among the primary level students.

EDSC (2001) conducted a study on “National Assessment Level of Grade Three Students”. This report focused on achievement of grade three students in Nepali, Mathematics and Social Study. This study intended to assess the performance level of grade three students and determinant factors contributing students’ achievement. Among many factors, sex was one of them. The result found that the performance of boys was better than the performance of the girls.

DeCecco and Crawford (1977) found that the average mean score for girls is lower than the boys. The difference is more pronounced in mathematics. In mathematics, the girls’ mean score was far lower than of the boys. According to Velez (1993), gender produces mixed result as a predictor of achievement which 42 percent of the models point out males as better achievers. Similarly, Elley (as cited in UNESCO, 1997) reported that in studies throughout the world, in developing as well as developed countries, girls’ performance was better than boys in the earlier grades, especially in literacy skills.

Neupane (1985) found that there was significant difference in the achievement of grade eight students by sex and locations of the schools. In this regard, CERID (1997) indicated that the total mean score of girls (28.29) in the SLC was significantly lower than the boys (30.16). Similarly, the national mean scores of girls in all seven subjects are less than those of the boys (CERID, 1999)

The language spoken at home by the students and the medium of instruction in school are the factors affecting students' achievement in mathematics. Burkheimer et al. (as cited in Rahaman 2003) investigated that the instruction in the native language improves mathematics achievement. In this study, it was concluded that the medium of instruction other than their mother tongue had negative influence towards the achievement in mathematics. CERID (1984) reported that the children from a family in which Nepali language was spoken at home had a significantly higher achievement than the one whose family language was not Nepali.

NCTM (1992) summarized the research criticism by many writers involving bilingual population despite consideration to social class. When comparing bilingual population to monolingual English speakers in terms of mathematics achievement, it concluded that it caused low mathematics achievement or bilingualism caused low level of achievement. Fernandez and Nielsen (ascited in NCTM,2004) found that monolingual students were stronger predictors of mathematics achievement. CERID (1990) investigated that language spoken at home had strong effect on students' achievement. This study also pointed out that the students' who learn mathematics in their mother tongue at primary level performed better on mathematics concepts than who did not learn in their mother tongue. In contrast, BPEP (1997) observed the effects of language spoken at home and its correlation to students' achievement. In regression analysis, the study showed that the language spoken at home did not influence students' achievement.

In these days, TV has become one of the components of human life especially of school level students. Walberg (1986) showed that peer groups' exposure to the mass media, particularly television, strongly influences their learning. The study concluded that the students who watch TV more than 2 hours per day had achieved low scores in mathematics. He suggested that parents can make improve their children's academic performance by encouraging them at home, supervising homework and reducing television viewing. Ghimire (2006) concluded that watching television was also one of the causes that affect on student's achievement. Students who spent more time on watching TV at home had shown low performance in mathematics.

There are several researches related on homework or study at home and its effect on students' achievement. According to Keith (1982), low achiever students can receive grades similar to those of high achiever students, if they spend more time on doing homework. Velez (1993) says in developed as well as in developing countries, half of the models reviewed

show a positive relationship between doing assignment or homework and student achievement (12 out of 28) and only 2 found negative relationship. Similarly, CERID (1989) study shows that there are several benefits of assignment or homework. Children develop the habit of doing tasks by themselves, which arouses self-confidence and a sense of responsibility.

Vaidya (2002) studied the relationship between students' personal factors and their achievement with the sample of 203 families of students of twelve public secondary schools. He conducted from a multiple regression equation on the students' academic achievement among the high achiever and the low achiever. This study concluded that there was a positive relationship between one' achievement score and the average time devoted at home in subjects taught at school. It also concluded that the impact of the language at home and school did not make any differences in overall achievement in school. The mean achievement of male was higher than the mean achievement of female students. Ghimire (2006) conducted a research on "Factors affecting students' achievement in mathematics at lower secondary schools of Kathmandu district". The objective of the study was to assess the existing lower secondary level students' achievement in mathematics, to find out the determinants (variables) that affect the students' achievement in mathematics and to compare on achievement of lower secondary students in the area of Arithmetic, Algebra, Statistics and Geometry of mathematics. He conducted mathematics achievement test and students' questionnaire for 450 students of sample schools. He used one way ANOVA test to examine the significance of the difference between the mean score and different variables. The mean score in mathematics was 24.48 with standard deviation 7.96. The study concluded that there was a significant difference between the mean achievement in mathematics belonging to different age groups, the time spent on watching television, the time spent on household work, the time spent in games and sports, and the support on math study at home. The study concluded that the language

spoken at home and the math study at home had not an effect on increasing students' achievement in mathematics.

Bajracharya (2007) conducted a research on "Determinants of achievement status of grade eight students in mathematics". The objective of the study was to make an assessment of achievement level of grade eight students in mathematics, to identify determinants that influence achievement of grade eight students in mathematics and to suggest measures that can help to improve achievement level of grade eight students. Multiple regressions were used to determine the prediction of variables in achievement and ANOVA test was performed to check the significance between the achievement and different variables. The study found that female students secured less than the male students. The students from the urban schools secured higher than the students from the rural schools. The study concluded that the students who learnt mathematics in English medium had better performance compared to those who learnt it in Nepali or mixed. The number of hours on watching TV also affected achievement in mathematics.

Conceptual Framework of the Study

This study had its own conceptual framework. The framework recognizes some selected personal factors of the students; gender, time hours on watching television and time hours on studying mathematics at home. To collect the data of achievement and personal information of the student mathematics achievement test and questionnaire form was administered. Then grouping the achievement into different variables. Analyzed the achievement by using descriptive statistics and compare their means by using f-test and t-test. And study the present level of achievement and their significances on personal variables.

Conceptual framework of the study

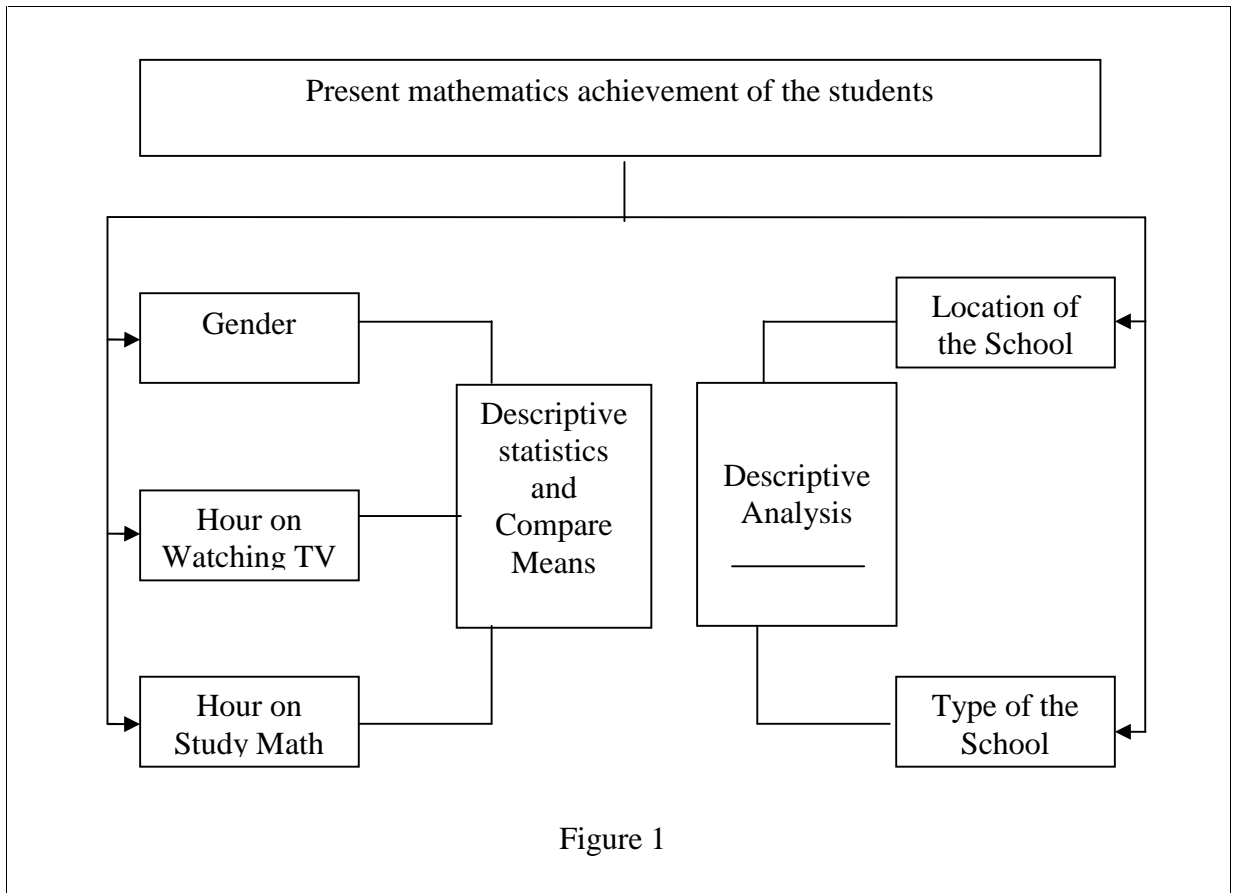


Figure 1

Chapter III

METHODS AND PROCEDURES

This chapter explains the methodology, which are used to conduct research and techniques applied to collect and analyze the data based on the information. Descriptions of the research tools, its development procedures and ways of analyzing data have been given in details, and finally the researcher argues for the ethical concerns of the study.

Research Design of the Study

Research design is the conceptual structure within which research is conducted. It constitutes the blueprint for the collection, measurement and analysis of data (Creswell, 2003). This study was based on survey design within quantitative approach.

Population of the Study

Population or the universe of the research indicates to the entire mass that will be observed. The sample observation provides only an estimation of population characteristic (Sharma, 2000). The population of the study consists of all grade eight students reading in kaski district in academic session of 2015. The numbers of secondary and lower secondary schools are as follows:

Table 3.1 Number of Secondary and Lower Secondary Schools

Secondary Schools	Lower Secondary Schools	Total
251	25	276

(Source: District Education Office, Kaski)

The total male population and female population during the academic year 2015 of grade eight in Kaski district was as follows:

Table 3.2 Number of Male Students and Female Students of Grade Eight

Male Students	Female Students	Total
6139	5836	11975

(Source: District Education Office, Kaski)

Sample of the Study

Sample is a part of research universe which is selected from a defined target population of representative for the purpose of investigation. The purpose of selecting sample is to obtain representative data about population to draw the results (Gupta, 1991). In this study, the researcher selected the sample with the minimum number of cases from the wider features of the population.

Selection of schools

To ensure a representative sample of the students from grade eight in Kaski district during the academic year 2015, both private and public schools from the urban and rural location were selected at first. Mathematics Achievement Test should administer to those students who were studied at grade eight. So the researcher selected only the secondary schools. There were altogether eight schools (four public schools and four privately managed schools) in the sample. The schools were selected by using random sampling method. The names and address of the schools are in "Appendix A". The number of private and public schools from the urban and rural location was as follows:

Table 3.3 Selection of Schools from Ecological Belt

	Private Schools	Public Schools	Total
From Urban Area	3	1	4
From Rural Area	1	3	4
Total	4	4	8

Selection of students

After having selection of sample schools, the researcher visited the sample schools, took permission from the head teachers and math teachers. All the students were selected in the case of those schools with maximum 25 numbers of students. In case of having more than that, 20 students were selected from each by systematic random sampling method. Through this way, there were total 190 students in a sample of this study including 101 female and 89 male students.

Instruments of the Study

The following instruments were used for the data collection.

) *Mathematics Achievement Test (MAT)*

) *Students' Questionnaire Form*

Mathematics Achievement Test

The researcher got standardized achievement test developed by Bajracharya (2007), which was used in her PhD dissertation "Determinants of achievement status of grade eight students in mathematics -2007". The researcher took help by that tool to develop the MAT. The achievement test constituted 64 multiples choices of items, which contains 20 items related to arithmetic, four related to statistics, 20 items related to algebra and 20 items related to

geometry. The mark weighted is equal for each question. Then convert the total marks in 100. The expected time for mathematics achievement test was two hours. And set of questionnaire for MAT is in “Appendix C” and the scoring key is in “Appendix D”

Students’ Questionnaire Form

From the help of available literatures, such as books, journal articles, magazines, national and international researches related to personal factors, the researcher selected the variables. Experts also provided important suggestions. According to their suggestions, some variables were revised and some were added. Their suggestions were accommodated while finalizing the list of variables. The piloting was conducted before finalizing the questionnaire form. There was a single section and more questions at first. Some questions were refined and some were merged. The refinements have been made for the clarity of the questionnaire. The final list of variables was gender of the student, hours on watching television and time hour on studying mathematics. On the basis of those variables, a set of questionnaire for the students was designed to collect their personal factors. It had altogether nine items. This form consisted of two sections. The first section consisted of three items which consisted name of the student, their gender and their school's name. The second section consisted six items, which were related to the student's personal factors: gender of the student, their mother tongue, language spoken at home language used at school, hours on watching television and hour on studying mathematics at home. The format of student's questionnaire form has been kept in “Appendix B”

Data Collection Procedure

The researcher visited to the sample schools, met the head teachers and subject teachers to administer the achievement test and questionnaires for the students. All the students were selected in the case of those schools with maximum 25 numbers of students. In case of

having more than that, 20 students were selected (10 boys and 10 girls as much as possible) from each school by systematic random sampling method. The help of concern subject teacher was taken while selecting the students. The researcher first explained the purpose of the students' questionnaire form to the participants. Then the questionnaire form was distributed to the participating students, which consisted of structured questions regarding the students' related variables. The questionnaires form filled by each student was checked and if any information in the form was not clear, again the students were made the information clear and make them to fill. The researcher collected the questionnaire form and then explained about the purpose of administrating the achievement test. At the same time, they were given guidelines about the ways of responding questions. This achievement test was administered for the students who were reading in grade eight.

Data Analysis Procedure

Mathematics achievement test was administered to obtain achievement score. The achievement test constituted of 64 multiple choices items, which contains 20 items related to arithmetic, four items related to statistics, 20 items related to algebra and 20 items related to geometry. One point was assigned for each correct answer and zero for incorrect answer while scoring the answer sheet of the students. The score obtained by each student was calculated and convert it into 100. Achievement scores were classified into different group and heading on personal factors of the student. The mean and standard deviation of scores of each group were also calculated. In order to test significance of scores of two or more groups of the students, one way ANOVA and independent sample test t- test was used. The researcher checked the following statistical techniques.

- J Descriptive statistics such as mean, standard deviation (S.D.) and mean differences were used to study the mean achievement and the deviation of the score of grade eight students in mathematics.
- J The one way ANOVA and independent sample test t-test was used to examine the significance of the difference among and between mean achievements of different variables of personal factors.

Ethical Consideration

First of all, the researcher approved the concept of research by the research team of Department of Mathematics Education, Kathmandu before collecting the data, the researcher took the permission from the concerned head teachers, class teachers and students. The participation in this study was being completely voluntary. Sampled school family and respondents were first informed about the nature of the study, the names of the researcher and supervisor, the title and purpose of the study and the reasons for the study. They were informed about the timing and the length of questionnaire as well as their rights during the study. The names of all participations remain confidential. Indeed, the real names or other forms of identification of all participation was not be used in the entire documents associated with the research. All data collected was securely stored on computer disk and the researcher is the only person with access to these data.

Chapter IV

ANALYSIS AND INTERPRETATION OF DATA

The purpose of this study was to find out the present achievement level of grade eight students in mathematics, to check the significant difference between the achievement in mathematics and the personal factors of the students. The present achievement status of grade eight students of Kaski district was analyzed based on the scores obtained from Mathematics Achievement Test. The hypothesis are tested to determine whether there is significant difference in math achievement and the personal factors of the students with the help of one-way ANOVA and independent sample test t- test. The first research question was; what is the present achievement level of grade eight students in Mathematics? And second was does there mean differences are significant statistically accordingly different personal variables.

Achievement Level of Grade Eight Students in Mathematics

This section analyzes mathematics achievement of grade eight students of Kaski district. In order to analyze the overall achievement in mathematics, an achievement test was administered among the grade eight students of sample schools. The number of total students in the sample was 190. The scores obtained in achievement test were analyzed from the perspectives of gender, types of schools the location of schools, TV- time and math studying time at home. The descriptive analysis (mean, standard deviation and mean differences) of the scores and test the significance differences in math achievement and the personal factors. The one-way ANOVA and t test was run to test the significance among and between the variables.

The mean achievement of the students in mathematics was 45.55.with standard deviation 15.51.The UNESCO conducted the National Assessment of Students Achievement of

grade eight students in 2013 and found the national average in mathematics was 40. Which showed the average achievement of this research was higher than the national average.

Achievement in Mathematics and Gender

The scores obtained in achievement test were analyzed from the perspectives of gender, by descriptive analysis of mean, standard deviation and mean differences to check their mean achievement and deviation. Result showed in following table:

Table 4.1 Descriptive Statistics of Male and Female

Gender	N	Mean	Std. Deviation	Mean Difference
Male	89	47.2809	14.64038	0.37991
Female	101	46.9010	15.32547	
Total	190	45.55	15.51	

The mean score and the S.D. of the students of male students were 47.28 and 14.64 respectively. The mean score and the S.D. of the female students were 41.90 and 15.78 and the mean difference is 0.37991. (See table 4.1) The female students are more than male students. The mean of male and female students' achievement is look like equal. That mean they have very low mean differences. Which means gender does not effect in mathematics achievement. Which seemed broke the primitive conception of parents, teachers, educationist and all the stakeholders.

He checked whether the mean achievement accordingly gender was statistically significant or not? To check the significance of mean achievement accordingly gender, the independent sample test t-test was used at 0.05 level of significance with equal variances not assumed.

Table 4.2 Independent Samples Test between Achievement of Male and Female

Gender	T	df	Sig. (2-tailed)	Level of Significance
Equal variance not assumed	0.174	188	0.862	0.05

From the above table, the observed level of significance value (Prob-value) $P=0.862$ and assumed level of significance $=0.05$ (See table 4.2). The P-value is less than or equal to then reject the null hypothesis, or accept or reserve the judgment or significance to judgment. So P-value is greater than level of significance ($P >$) Hence, there is no significant difference between the mean mathematics achievement of male and female students.

Achievement in Mathematics and Location of Schools

The scores obtained in achievement test were analyzed from the perspectives of location of schools, by descriptive analysis of mean, standard deviation and mean differences to check their mean achievement and deviation. For that equal number of school from urban and rural area. Result showed in following table:

Table 4.3 Descriptive Statistics of Urban and Rural School

Location	N	Mean	Std. Deviation	Mean differences
Urban	109	48.8440	14.87863	7.3996
Rural	81	41.4444	13.78858	

The mean score and the S.D. of the students of urban schools were 48.84 and 14.87 respectively. The mean score and the S.D. of the students of rural schools were 41.44 and 13.78 respectively and the mean differences was 7.3996 (See table 4.3) above table showed

the achievement of urban school student obtain higher marks than rural school students.

There was found high deviation between the mean achievement of urban school student and rural school student. So we need to improve quality of achievement of the rural school students.

Achievement in Mathematics and Types of Schools

The scores obtained in achievement test were analyzed from the perspectives of type of schools, by descriptive analysis of mean, standard deviation and mean differences to check their mean achievement and deviation. For that, three public schools from rural and one from urban likewise three private school from urban and one from rural. Result showed in following table:

Table 4.4 Descriptive Statistics of Private and Public School

Type of School	N	Mean	Std. Deviation	Mean differences
Public	112	41.1696	14.40213	10.6702
Private	78	51.8398	17.59699	

The mean score and the S.D. of the students of Public schools were 41.1696 and 14.02 respectively. The mean score and the S.D. of the students of Private schools were 51.8398 and 17.59 and high mean difference was 10.6702 (See table 4.4). The student achievement who studied in private school are better than public school. It also shown that the achievement of the Private school student are highly deviated which mean less consistent. And the deviation between the mean achievement of public school student and private school are highly deviated.

Achievement in Mathematics and Time Hours on Watching TV

In present days the almost all students spent time on watching TV so the scores obtained in achievement test were analyzed from the perspectives time hours on watching TV, by descriptive analysis of mean, standard deviation and mean differences to check their mean achievement and deviation. The following result was obtained.

Table 4.5 Descriptive Statistics of Achievement and Time Hour on TV

Time hours on Watching TV	N	Mean	Std. Deviation
0-1 hour	89	45.2809	13.88834
1-2 hours	68	47.9706	14.56531
2-3 hours	33	41.1818	16.68

The mean score and the S.D. of the students who watched TV 0-1 hr per day were 45.52 and 13.88 respectively. The mean score and the S.D. of the students who watched TV 1-2 hrs per day were 40.9706 and 14.56. The mean score and the S.D. of the students who watched TV 2-3 hrs per day were 41.1818 and 16.68 respectively (see table 4.5). The most of student spent 1 or 2 hour on watching at home. And low students were spent 3 hr watching TV so their achievement was not good. The students who spent less time on TV had better consistent result. But, less consistent in achievement of mathematics who spent lengthy time on watching TV. The mean difference was low between 0-1 hour and 1-2 hour on watching TV but high between remaining other groups. Low number of student 2-3 hour TV and their S.D. was higher than other.

For the test significance, at first the one way ANOVA was used to test the significance among mean achievement between groups and within groups. If one way ANOVA

showed significance then independent sample test t-test would be used for independent variables of the time hour on watching TV. The analysis table is below.

Table 4.6 One- Way ANOVA among Achievement and Time Hour on TV

	Sum of Squares	df	Mean Square	f	Sig.
Between Groups	852.041	2	426.020	1.987	0.140
Within Groups	40100.828	187	214.443		
Total	40952.868	189			

From the above table, the calculated observed significance value (prob-value) $P=0.140$ is greater than assumed level of significance $=0.05$ (See table 4.6). Statistically, there was no significance at 0.05 level of significance. Hence, there is no significant difference in the mean mathematics achievements among the students by their time on watching TV.

Statistically the time hour on watching TV does not affect the student's achievements in mathematics. Result showed no significance. So, no need to test the independent sample between groups, i.e. t-test. Which could indicate that the student might have engaged in other tasks, viz. hanging on mobile phone, playing games, involved in household work. That might have hampered their study.

Achievement in Mathematics and Time Hours on Studying Mathematics

The time hour on studying mathematics at home is the major variable of the personal factors of the student. So the achievement was analyzed accordingly the time hour on study. For that descriptive like mean, standard deviation and mean differences were calculated to find the level of achievement and their deviation. The following result was found:

Table 4.7 Descriptive Statistics of Achievement and Time Hour studying Mathematics.

Time Hours on Studying Mathematics	N	Mean	Std. deviation
0-1 hour	63	40.2540	13.62868
1-2 hours	82	48.2561	13.61264
2-3 hours	45	44.57	16.87

The mean score and the S.D. of the students who spent 0-1 hour on studying Mathematics were 40.25 and 13.62. The mean score and the S.D. of the students who spent 1-2 hours on studying Mathematics were 48.25 and 13.61. The mean score and the S.D. of the students who spent 2-3 hours on studying Mathematics were 44.57 and 16.87 respectively. Most of the student spent 1 or 2 hr on studying Mathematics at home. (See table 4.7) and there was found high mean differences between the different time hour in study. The achievement of the students who studied 1 or 2 hours was found consistent and who studied 3 hours was found less consistent.

For the test significance, at first used the one-way ANOVA to test the significance among mean achievement between groups and within groups. If one-way ANOVA showed significance then independent sample test t- test need to use for every groups between each groups. The result of the one-way ANOVA is mention on below table.

Table 4.8 One-way ANOVA between Achievement and Time Hour on Study

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1362.320	2	681.160	3.2173	0.031
Within Groups	39590.548	187	211.714		
Total	40952.868	189			

From the above table, the observed level of significance value (Prob-value) $P=0.031$ and assumed level of significance $=0.05$. (See table 4.8) The P- value is less than or equal to then reject the null hypothesis, or accept or reserve the judgment or significance to judgment. So P-value is less than level of significance ($P < .$). Hence, there is significant difference in mean mathematics achievement an hour on studying mathematics between the groups and within the groups.

Since the one-way ANOVA showed significance so, independent sample test (t-test) need to run between the each group. The result of analysis of independent sample test between the time hours on studying mathematics at home as follows:

Table 4.9 Independent sample Test between Different Time hours on studying Mathematics.

Time Hours	Time Hours 0-1 and 1-2			Time Hours 1-2 and 2-3			Time Hours 0-1 and 2-3		
	t	df	Sig.(2-tailed)	t	df	Sig.(2-tailed)	t	df	Sig (2-tailed)
Equal variance not assumed	-2.6	133	0.010	1.56	85.5	0.123	-2.18	90.9	0.018

From the above table, the observed level of significance value (Prob-value) $P=0.01$ and assumed level of significance $=0.05$ (See table 4.9). The P- value is less than or equal to then reject the null hypothesis, or accept or reserve the judgment or significance to judgment. Hence, there is significant difference between the mean mathematics achievement of 0-1 and 1-2 hours on studying mathematics.

Again the observed level of significance value (Prob-value) $P=0.123$ and assumed level of significance $=0.05$ (See table 4.9). The P- value is less than or equal to then reject the null hypothesis, or accept or reserve the judgment or significance to judgment. Since $P > .$ Hence, there is no significant difference between the mean mathematics achievement of 1-2 and 2-3 hours on studying mathematics.

The observed level of significance value (Prob-value) $P=0.018$ and assumed level of significance $=0.05$ See table 4.9). Since P-value is less than level of significance ($P < .$). Hence, there is significant difference between the mean mathematics achievement of 0-1 and 1-3 hours on studying mathematics.

CHAPTER V

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to obtain the result of mathematics achievement test from a sample. The study attempted to find out the present achievement level of the students in mathematics of Kaski district, to check the significant difference between the achievement in mathematics accordingly the personal factors of the students.

Quantitative method was used in this study. MAT was conducted among 190 students of sample schools of Kaski district who was studying at grade eight in the academic session 2015. At the same time, student's questionnaire form was administered to all those selected students to collect the information about their personal factors. The hypothesis was tested by one-way ANOVA and independent sample t-test to check the significant difference among and between the achievements in mathematics accordingly personal factors of the students.

It was found that the mean achievement of the students in mathematics was 45.55 with standard deviation 15.51. It was also concluded that there were significant differences between the achievement in mathematics and the selected personal factors of the students (gender, hours on watching TV and time hour on studying on math at home).

Findings

The findings are the ultimate goal of any research. There were three research questions in this study. The several results were found from the mathematics achievement test of grade eight students of Kaski district. Some of the major findings related to the achievement level of students were as follows:

) The total mean achievement was 45.55 with standard deviation 15.51.

- J The mean and S.D of male and female was 47.28 and 14.64 and 46.90 with 15.32 respectively
- J The mean and S.D. of achievement of students from urban and rural was 48.84 with 14.87 and 41.44 with 13.78 respectively.
- J The mean and S.D. of achievement of the students from the public and private schools was 41.16 with 14.40 and 5.82 with 15.59 respectively
- J The mean and S.D. of the achievement of the students of 0-1 hour 1-2 hour and 2-3 hour on watching TV was 45.28 with 13.88, 47.97 with 14.56 and 41.81 with 16.68 respectively.
- J The mean and S.D. of the achievement of the students of 0-1 hour 1-2 hour and 2-3 hour on study mathematics was 40.25 with 13.62, 48.25 with 13.61 and 44.57 with 16.87 respectively.
- J The study also found that statistically there were no significant differences between mean achievements in mathematics accordingly gender and time hour on watching TV.
- J The study also found that there was significant difference between mean achievements in mathematics accordingly time hour on studying mathematics. Where significant the mean achievement between 0-1 hour and 1-2 hour study time as well as significant mean achievement between 0-1 and 2-3 hours study time. But there was no significant difference between mean achievements in mathematics accordingly 1-2 time hours and 2-3 time hours on studying mathematics.

Conclusions

On the basis of above finding drawn above it can be conclude that the mean achievement of the students of Kaski district was 45.55 which was higher than the national average

achievement in mathematics. Statistically, the gender does not play the significance role in the achievement of mathematics as well as the time hour on watching TV cannot play the significance role in mathematics achievement. But the time hour on study mathematics at home can play the significant role in achievement in mathematics. So student should have increase the time hour on studying mathematics for good achievement in mathematics.

Implication and Recommendation

This study concluded several findings on the students' achievement in mathematics. It was concluded the personal factor of the student plays significant role in their achievement. The findings and conclusions will have the following implications in different area in the field of education. The educational institutes of Kaski district, District Education Office, Ministry of Education and other stakeholders can have the present achievement level in mathematics and launch the programmes to increase it in coming sessions. The public schools and the schools of rural area had low achievement in mathematics than the private schools and the schools of urban area. So the concern stakeholders can use this document to know about the achievement in mathematics in Kaski district at grade eight student. The teachers parents should discourage the students to watch unnecessary programmes on TV at home and encourage the students to revise the lessons properly by taking enough time at home. The parents should help to manage the time for study and watching TV for their children. The parents should aware about the time spent on math study at home by their children and encourage them to spend enough time on math study. For the recommendation part, the study was conducted in Kaski district. Due to the shortage of time and other resources, the researcher could not go very rural village. There are many researches were conducted in this areas. The further research is needed on the same topic but in rural VDC to see the achievement level and their significance in achievement.

This study concluded that there were differences in achievement of private and public schools, rural and urban schools. The further research is needed to explore the causes on why the achievement of students from private schools and public schools; urban schools and rural schools are different.

While searching the literatures during the study, the researcher found that there were various factors that affect on math achievement. This researcher at first selected few personal factors and studied its affect on achievement. But there were many personal factors beyond this study, so it would need to explore more factors and test their significance in achievement.

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Appendix A

Names of the Sample Schools

School Name and Address	Public or Private	Urban or Rural
Machhapuchhre Higher sec school, Dhikurpokhari-4, Kaski	Public	Rural
Mahendra Secondary School, Pokhara-29 ,GharmiKaski	Public	Rural
Himalaya secondary school, Mamarjun-3, Tangting, Kaski	Public	Rural
Chorepatan Higher Secondary School, Pokhara -17, Kaski	Public	Urban

GurukulBidhyaSadan Higher Secondary School, Newroad, Pokhara, Kaski	Private	Urban
PokharaUnnited Academy, Pokhara-12, BhadrakaliMarg, Kaski	Private	Urban
BalMandir Secondary School Dhikurpokhari-6, Kaski	Private	Rural
View Point Secondary School, Pokhara-15, Tutunga, kaski	Private	Urban

Appendix B

Student's Questionnaire Form

Dear respondents, this data will be used only for research purpose. The researcher will keep this data secret and will not be disclosed. Please, fill whatever you do and feel so that the researcher will come up with the correct conclusion.

Fill in the blanks and give right () to the appropriate option.

Section "A"

Name:-.....

Gender:-Male Female

School's Name:-.....

Section "B"

1) What is your mother tongue?

2) Which language do you use at your home?

Nepali gurung magar others.....

3) Which language does your math teacher use when teaching in class?

Nepali English: Both

4) How many hours per day do you spend on average on watching television at your home?

(0 – 1) hour

(1 – 2) hours

(2– 3) hours

5) Which programs do you usually watch?

1)

2).....

3).....

6) How many hours per day do you spend on average on study mathematics at your home?

(0 – 1) hour

(1 – 2) hours

(2–3)hours

Appendix C

Achievement Test Questions

Mathematics Achievement Test, (Grade VIII)

Direction

Name of the student

Time:2hours

Name of the school

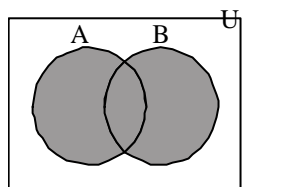
Address.....

Roll no -.....

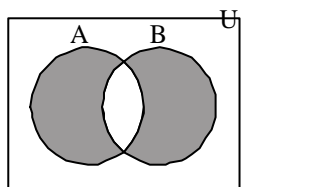
Please read the questions carefully and put a tick mark () against the letter (a, b, c, d) which you think is correct. Separate sheet of paper may be used for rough practice.

- If $N = \{1, 2, 3, 4\}$ and $W = \{0, 1, 2, 3, 4, 5, 6\}$, what is the intersection of sets N and W?
a) $\{1, 2, 3, 4\}$ b) $\{0, 1, 2, 5, 6\}$ c) $\{0, 1, 2, 3, 4, 5, 6\}$ d) $\{1, 2, 3\}$
- If $A = \{b, d, g, h\}$ and $B = \{a, b, c, d, e, f, g, h\}$, then $B-A$ is equals to
a) $\{a, c, e\}$ b) $\{b, d, g, h\}$ c) $\{a, b, c, d, e, f, g, h\}$ d) $\{a, c, e, f\}$
- What is the sum of 342_5 and 134_5 ?
a) 1013_5 b) 431_5 c) 1130_5 d) 1031_5
- Change the number 111_2 in base ten.
a) 111 b) 3 c) 7 d) 5
- Which one of the following is a cube number?
a) 25 b) 16 c) 36 d) 343
- Which one of the following shaded region in Venn diagrams shows $A \cap B$?

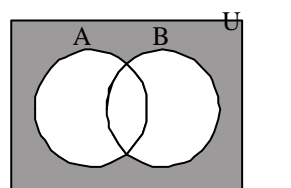
a.



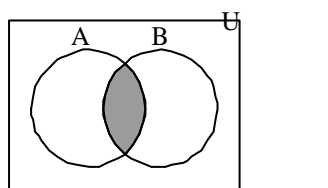
b.



c.



d.



- What is the measure of the side of a square, whose area is 16 cm^2 ?

29. A rectangle has an area of $(X^2 + 6X + 8)$ square unit and the length of one side is $(X + 4)$ unit, what will be the length of other adjacent side?

- a) $X + 2$ b) $X + 6$ c) $X - 2$ d) $2X + 8$

30. Express $16X^2 - 40XY + 25Y^2$ as a perfect square?

- a) $(4X + 5Y)^2$ b) $(5X - 4Y)^2$ c) $(5X + 4Y)^2$ d) $(4X - 5Y)^2$

31. What is the value of $(X + 3)^3$?

- a) $X^3 + 9X(X + 3) + 27$ b) $X^3 - 9X(X + 3) + 27$

- c) $X^3 - 9X(X - 3) - 27$ d) $X^3 + 9X(X - 3) - 27$

32. Factorization of $X^2 + 15X + 56$ is

- a) $(X + 7)(X - 8)$ b) $(X + 7)(X + 8)$ c) $(X - 7)(X + 8)$ d) $(X - 7)(X - 8)$

33. What is the area of the shaded part in the given figure?



X

- a) $X^2 - 9$ b) $X^2 - 3$ c) X^2 d) $X^2 - 6$

34. What is the H. C. F. of the expressions $(X^2 - 9)$ and $(X^2 - 6X + 9)$?

- a) $X - 3$ b) $X + 3$ c) $X + 2$ d) $X + 5$

35. If $a = 2$, $b = -1$ and $c = 3$, then what is the value of $3a^2b^2c$?

- a) 36 b) -36 c) 24 d) 12

36. What is the L. C. M. of two algebraic expressions?

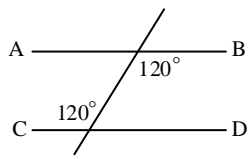
- a) Common factor \times first expression
 b) Common factor \times second expression
 c) Common factor \times remaining expression
 d) Factors of first expression \times factor of second expression

37. What is the simplification of $\frac{a^2 \Gamma ab}{a^2 Z ab} \mid \frac{a Z b}{a \Gamma b}$?

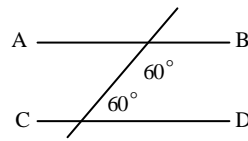
- a) $\frac{a Z b}{a \Gamma b}$ b) $\frac{a}{b}$ c) 1 d) $\frac{b}{a}$

46. Which of the following conditions is correct representation for AB and CD as parallel?

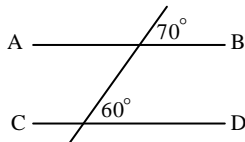
a)



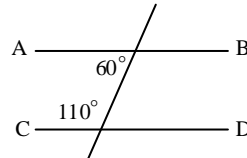
b)



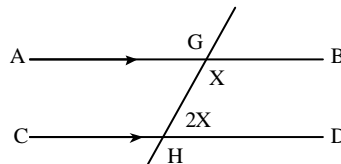
c)



d)



47. In the figure, $AB \parallel CD$ and GH is transversal and $\angle BGH = X$ and $\angle DHG = 2X$, what is the value of X ?



a) 80°

b) 70°

c) 180°

d) 60°

48. Which of the following statement is true?

a) Alternate angles are not equal

b) Corresponding angles are not equal

c) Sum of complement angles is 180°

d) Sum of the consecutive angles is 180°

49. What do we call a regular polygon if it has one interior angle equal to 120° ?

a) Pentagon

b) Hexagon

c) Septagon

d) Octagon

50. Using Pythagoras theorem, which one of the following data represents a right-angled triangle?

a) $5\sqrt{3}$ cm, 5cm, 10cm

b) 8 cm, 7 cm, 10cm

c) 9cm, 10cm, 1 cm

d) 4cm, 5cm, 6cm

51. If the perimeter of a square is 20 cm and length of a side is a cm, then what is the value of a?

a) 20 cm

b) 1 cm

c) 5 cm

d) 4 cm

52. What do we call the quadrilateral ABCD, if it has $AB \parallel DC$, $AD \parallel BC$ and $\angle DAB = 90^\circ$?

a) Parallelogram

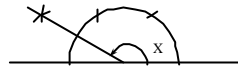
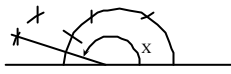
b) Rectangle

c) Trapezium

d) Rhombus

53. Which of the following measure 165° ?

a.



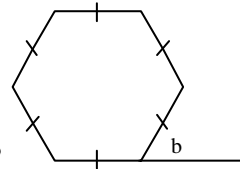
b.

c.



d.

54. What is the value of b in the following figure?



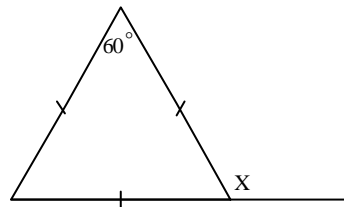
a) 120°

b) 60°

c) 30°

d) 180°

55. What is the value of X in the following figure?



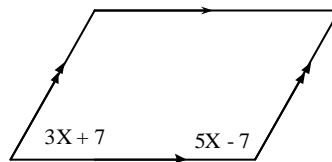
a) 60°

b) 120°

c) 30°

d) 40°

56. Calculate the value of X in the following figure ?



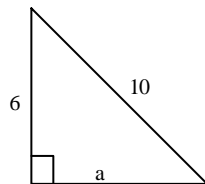
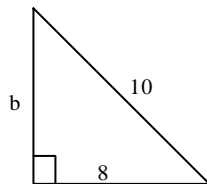
a) 107°

b) 180°

c) 22°

d) 176°

57. In the following pair of congruent triangles, what are the lengths of sides a and b?



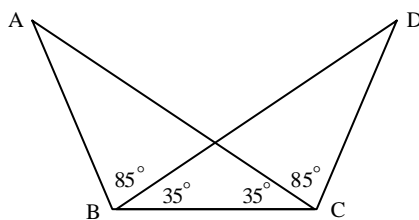
a) a = 6 and b = 8

b) a = 8 and b = 10

c) a = 10 and b = 8

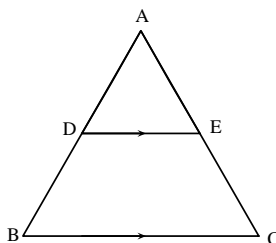
d) a = 8 and b = 6

58. Which facts support that the $\triangle ABC$ and $\triangle DBC$, in the following figure, are congruent?



- a) S. A. S. b) S. S. S. c) A. S. A. d) R. H. S.

59. In the figure, $AD = 6$ cm, $DB = 4$ cm, $AE = 4$ cm. What is the value of EC ?

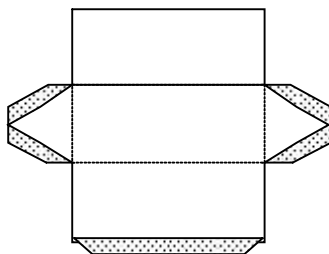


- a) $\frac{8}{3}$ b) $\frac{9}{2}$ c) $\frac{9}{4}$ d) $\frac{18}{10}$

60. If $A = 16$ cm² and $h = 4$ cm, then what is the value of a volume of a triangular prism?

- a) 20 cm³ b) 16 cm³ c) 32 cm³ d) 64 cm³

61. The following net represents?



- a) Net of hexagonal prism b) Net of triangular prism
c) Net of cylinder d) Net of dodecahedron

62. If $r = 2$ cm, $h = 3$ cm, what is the total area of a cylindrical box?

- a) $2f$ cm² b) $20f$ cm² c) $10f$ cm² d) $6f$ cm²

63. A circular pond has the radius of 8 cm. What is the area of the pond?

- a) 200.96 cm² b) 201.14 cm² c) 250.2 cm² d) 205.21 cm²

64. The bearing of a point from A to B is 062° . What is the bearing of point B to A?

- a) 240° b) 120° c) 060° d) 090°

Appendix D

Scoring Key of MAT

1(a)	17(b)	33(a)	49(a)
2(d)	18(b)	34(a)	50(a)
3(d)	19(b)	35(c)	51(c)
4(c)	20(c)	36(c)	52(b)
5(d)	21(c)	37(c)	53(a)
6(a)	22(a)	38(b)	54(b)
7(b)	23(a)	39(c)	55(b)
8(b)	24(a)	40(c)	56(c)
9(b)	25(c)	41(a)	57(d)
10(c)	26(a)	42(a)	58(c)
11(d)	27(b)	43(a)	59(a)
12(b)	28(a)	44(b)	60(d)
13(a)	29(a)	45(d)	61(b)
14(b)	30(d)	46(a)	62(b)
15(b)	31(a)	47(d)	63(b)
16(b)	32(b)	48(c)	64(a)