

Chapter-I

INTRODUCTION

Background of the Study

The term 'Achievement' is defined in Oxford Advance Dictionary as 'the things done successful especially with effort the skill'. 'Achievement is the tool for evaluating the students which help to determine the quality of the student in related areas. The popular and reliable evaluating tool for students is examination. There are different types of examinations to scale student achievement in different level. The tools of achievement are examination such as oral, written, Practical etc. They can be reliable means for the determination of achievement of student. There are several factors that are responsible for the achievement of the student. Those factors may be teacher education, teacher personality, home environment, instructional materials, individual difference, peer group, parent's attitudes and socio-economic status etc.

Mathematics plays important role on the development of human civilization. Mathematics begins with the origin of the human being. Human beings developed mathematics to fulfil their needs. "Mathematics, as much as music or any other art, is one of means by which we rise to a complete self-consciousness. The significance of mathematics resides precisely in the fact that it is an art: by informing us of the nature of our own minds it informs us of much that depend on our minds" (Sullivan, 1925).

Mathematics has several meaning for person to person. Mathematics has important role to fulfil the human needs. It helps people to understand, think and interpret the different types of aspect of natural phenomena. No one can ignore the importance of mathematics because of its wider application or utility on our day to day

activities. To make clear about important of mathematics Roger Bacon says
“Mathematics is the gate and key of all science”. Neglect of mathematic work is an injury to all knowledge. If any people ignore mathematics, they can't know the science and technology also the things of the world. Mathematics is also defined as the way of thinking because it helps to think differently and deeply. It is taken as the body of ideas structure by logical reasoning of the facts. Principles and methods on the basis of own rules which were developed in early human civilization to current time.

The report of higher level commission of 2055 gives some suggestion for secondary level education. It categorize three types of secondary education such as six to eight grade lower secondary, nine to ten grade secondary and eleven to twelve grade higher secondary. It also suggested that mathematics should be compulsory subject of 100 full marks and an optional mathematics of 100 full marks from grade nine to ten to the interested student. Likewise, In Nepal after 2008 B.S. different types of planning, commission were conducted which gave suggestion and direction to develop and fulfil educational needs of the people and society. Except these plan and commission several other programs such as teacher training, training for school head teacher, formative research for the improvement of the educational system had been conducted. Although the government could not able achieve the expected result.

Mathematics has great important role in every field and everyday life. It is a fundamental element in the development of science and technology. Today's world cannot run without mathematics. Everybody needs knowledge of mathematics for daily life and professional life. Nowadays mathematics has become one of the important studies in the developing nation of the world. In realization of the significant role of mathematics to nation, building the existing curriculum of Nepal has kept

mathematics as compulsory subject with 100 full marks from class one to ten. This was aimed at ensuring the insulation of mathematics literacy and the associated equipment with logical and abstract thinking needed for living, problem solving and educational furtherance. For full realization of this laudable objective of mathematics education, subject mastery and demonstrated achievement should evenly distributed across gender.

Mathematics has many more branches in secondary level. But Compulsory mathematics has eight branches which are Set, Arithmetic, Mensuration, Algebra, Geometry, Trigonometry, Statistics and Probability. All these branches are important for compulsory mathematics. Compulsory mathematics is an important subject in school curriculum. This subject plays a vital role to study engineering, science and other technical subject. Most of the students feel that mathematics is hard, gregarious subject thus few students are passed in exam. Mathematical knowledge is the backbone of the further study. Therefore, to be clear on this matter, this study is compare to know actual achievement of boys and girls in compulsory mathematics also to find the causes of low/high achievement in mathematics.

Statement of the Problems

Most of the disciplines such as science, medicine and technology may be handicapped without mathematics and the world cannot run smoothly without it. It has becomes a gatekeeper in the life of their carrier choice in further study. Therefore mathematics is the central part of the school curriculum not only in Nepal but also in the entire world. Most of the students in schools are poor in mathematics. So that low achievement in mathematics is common problem at school levels developed and undeveloped countries as well. More than half of the total students failed in

mathematics in previous years as result of school. Most of the result of research shows that there is girl's achievement is less than boy's achievement in mathematics. Thus the problem of the study concerned with the comparison of achievement of girls and boys students in mathematics and causes the low/high achievement in mathematics of grade X in Kailali district. The study has aimed to answer the following question:

- What is the achievement level of boys and girls in mathematics?
- Does the achievement of boys differ from the achievement of girls in mathematics?
- What are the causes of low and high achievement in mathematics?

Objectives of the Study

The main objective of the study was to compare the achievement of boys and girls of secondary level in mathematics in Kailali district. The objectives of the study were formulated as follows:

- To compare the achievement of boys and girls students of grade X in mathematics at Kailali district.
- To find the causes of low and high achievement in mathematics at Kailali district.

Formulation of Hypothesis

The following null and alternative hypotheses were hereby stated:

- H_0 : There was no significant difference between the achievement scores of boys and girls students of public schools in mathematics of grade X in Kailali district.

H_1 : There was significant difference between the achievement scores of boys and girls students of public schools in mathematics of grade X in Kailali district.

- H_0 : There was no significant difference between the achievement scores of boys and girls students of private schools in mathematics of grade X in Kailali district.

H_1 : There was significant difference between the achievement scores of boys and girls students of private schools in mathematics of grade X in Kailali district.

- H_0 : There was no significant difference between the achievement scores of boys students of private schools and girls students of public schools in mathematics of grade X in Kailali district.

H_1 : There was significant difference between the achievement scores of boys students of private schools and girls students of public schools in mathematics of grade X in Kailali district.

- H_0 : There was no significant difference between the achievement scores of boys students of public schools and girls students of private schools in mathematics of grade X in Kailali district.

H_1 : There was significant difference between the achievement scores of boys students of public schools and girls students of private schools in mathematics of grade X in kailali district.

- H_0 : There was no significant difference between the achievement scores of total boys and total girls students in mathematics of grade X in kailali district.

H_1 : There was significant difference between the achievement scores of total boys and total girls students in mathematics of grade X in Kailali district.

Significance of the Study

Mathematics is very useful for vocational and higher specialized course of learning. Mathematics has significant place at all level of school education system in Nepal. Mathematics taught from primary level to secondary level as a compulsory subject. In compulsory mathematics have many branches. Mathematics achievement is the major factor for student's career development. In modern world, all the science and technology depends on mathematical knowledge. Mathematics is essential for human life. Mathematics knowledge is necessary in everyday life as well as higher studies in the field of science and technology. However, the discipline of mathematics is general as a difficult for everyday life and for higher studies. Testing the achievement over the related course would be one of better process to improve all the weakness. Effectiveness of learned knowledge by students in their daily life is main

thing. In addition, it is necessary to evaluate validity, appropriateness, usefulness of course content.

Every part of mathematics is useful for both boys and girls students. But girls are long backward in comparison to boys in respect to the educational development which had created a wide gap between them. Therefore it is important to find out the achievement difference in mathematics between girls and boys students. Which can be depends on the causes of low/high achievement in mathematics. On the basis of above fact this study has conducted. This study has some significance as follows:

- To help the mathematics teacher and educationist to follow the right strategy to enhance the achievement level of students in mathematics.
- Provide information to concerned people, agencies and government about comparative achievement status of girls and boys in mathematics at secondary level of Kailali district.
- To provide the achievement level of boys and girls students of school level in mathematics.
- To find the causes of low and high achievement in mathematics at kailali district.
- To help the students who are interested to do same types of study work in different subject.

Delimitations of the Study

The study was following delimitations:

- This study was limited to grade X students of Kailali district.
- This study had selected 3 public and 3 private schools of Kailali district
- This study had included score of marks of examination (achievement test) of class X.
- This study had limited total students from 6 sample school of Kailali district.
- This study had limited to find the causes of low and high achievement in mathematics.

Definition of Operational Terms

Achievement: Achievement defined in terms of the score obtained by the girls and boys in mathematics examination.

Compare of students: Analysis of boys and girls by received their marks.

Public School: The school established and sponsored by government of Nepal.

Private School: The school without any aid from the government runs by private investment by individual, union, agencies and any particular group.

Prior knowledge: Previous knowledge in related topic or subject matter.

Chapter-II

REVIEW OF RELATED LITERATURE

This chapter deals the review of the related literature. The review of related literature is an essential aspect and this work undertaken for documenting the research finding drawn by the different researchers related to present study. The review of related literature helped to make the concept clear for the study and directed to analyze and interpreted the data. The brief summary of the previous researches and writing of recognized experts provide evidence that the research is familiar with what is already known and untested. Since effective research must based upon past knowledge this step helps to eliminate the duplication of what have been done in past. That provides useful suggestion for significant investigation. Several types of related literature reviewed in this study, which helps to make the concept clear for the study literature reviewed in this study, which helps to make the concept clear for the study and direct to analyze and interpret the data.

Review of Empirical Literature

The empirical study of literature is an interdisciplinary field of research which includes the psychology, sociology, philosophy, the contextual study of literature and the history of reading literary texts. There are some studies related to student's achievement in mathematics. The review of related empirical literature helps to make the concept clear for the study and also directed to analyse and interpret the data sufficient literature related to this study. Few related literature had been reviewed as follows.

Shrestha (2002) has conducted a study on the topic “A Study of Mathematics Achievement of Private and Regular Students in SLC Examination”. The main objective of this study was to identify the trend in mathematics achievement of the schools attempting the SLC examination privately and regularly. The researcher had collected the data from Lalitpur district of the five years from 2054 BS to 2058 BS. The t-test was applied to conclude that the trend in achievement of private and regular students in Lalitpur district by using mean. Research found scores were decreasing in both the cases in similar manner and also mathematics achievement of the private and regularly student's did not differ in the examination.

Chaudhary (2000) has conducted a study on the topic “A Comparative Study of Achievement in Mathematics of Primary Level”. The objective of this study was to determine the effect of parent educational status on the achievement in mathematics of grade five students of separately district. Researchers prepared an achievement test for the students and attitude scale for parents. Simple percentage mean, standard deviation, t-test were used. The finding of this study showed that the mathematics achievement of literate parents children was found to be higher than illiterate parents children.

Bhagat(2007) has conducted a study on the topic “A Study on Mathematics Achievement of Primary Level Students of Rai and Tharu Casts in Udhaypur District”. The researcher selected nine public schools and the purposive sampling method was followed in the selection of sample. He selected 216 sample students where 108 students were Rai and 108 from Tharu students. The main objective of this study was to find out the difference in mathematics achievement of Rai and Tharu students. For this, t-test with two tailed was used to test the research hypothesis at 0.05 level of

significance. His conclusion was the achievement of Tharu students is higher than Rai students.

Dulal (2009) carried the thesis for master's degree on "Causes of Anxiety in Mathematics Learning". This study is the qualitative nature. The sample of the study was 100 secondary schools. Students the tool was interview, observation and collecting the data also views as an article. The finding the research was cause of anxiety in mathematics learning as conceptual weakness, structural weakness. In effective teaching method and material absence of effective teaching method and materials and also upgrading system being failed in any two subjects and so on.

Yadav (2013) conducted a research on "A Study of Mathematics Achievement of Student at Grade VII in Siraha". The first objective to find out the level of mathematics achievement of grade VIII, second objective students achievement in four curricular areas arithmetic's, statistics, algebra and geometry of mathematics, third objective to compare achievement of boys and girls in mathematics also forth objective was compare achievement between the urban and rural school students in mathematics. The design of study was survey design. In ordered to collect the data six public school and 150 students were selected to purposive sampling. The finding of the research was the mean score of grade VIII student in mathematics of Siraha district was 16.81, the achievement percentage of the student in arithmetic statistics, algebra and geometry were 44.42%, 41.57% and 39.39% respectively. The means score of arithmetic was higher than statistics, algebra and geometry. The mean score of urban school was higher than rural school by 3.07. Finally, the conclusion of the researcher was significant difference in the achievement among the four curricular areas of

mathematics and there was better performance of urban school students over the rural school student's achievement in mathematics.

Chataut (2014) conducted the thesis in "Achievement in Mathematics by Gender" with the objectives to compare the achievement in mathematics by school, to compare the achievement in mathematics by year and to compare the achievement in mathematics by sex. 908 girls and 958 boys from five secondary government school had been selected through simple random sampling method from Kanchanpur district. For the sample of the study mean, standard deviation, t-test and ANOVA were applied. The conclusion that the achievement in mathematics of Kanchanpur district was less than national achievement of boys students and higher than girls, i.e. there was a significant difference between the mathematics achievement of girls and boys students of Kanchanpur District.

Bhattarai (2014) Conducted a research on "Secondary Level Students Achievement in Mathematics" Her prime objective was to compare the mathematics achievements of public and private schools students of Palpa district. Her purpose was to compare mathematics achievements gender. Finally her last objective was to find the role of parent's occupational status on their children's mathematics achievement. The design of the study was survey design. In order to collect the data the researcher prepared a set of questionnaire for the students and a teacher were interviewed similarly 30 student (15 boys and 15 girls) from each school were selected randomly. The finding of the research was the mean achievement of private school boys in higher than the public school girls by 11.46 in calculated t-value at 0.05 levels. This abdicated that the difference in mean achievement was found to be significant. Finally

the conclusion of the researcher was the students of private schools had better achievement in mathematics than public school of Palpa district.

Paudel (2014) did a research on “Factors Affecting Mathematics Achievement of Secondary Level Students”. The researcher was selected for sample taken from two secondary schools of Lamjung district. The main objective of this study was to explore the factors that affect mathematics achievement at secondary level. This study was a case study with qualitative as well as descriptive in nature. The researcher was taken direct interview with students, head teacher, mathematics teacher and parents for data collection. The conclusion of this researcher was as follows

- Students were busy for culture programme so they were absent in class.
- The interpersonal relationship between the teachers and students were not maintained properly. Teacher biased the students.
- The main occupations of parents were agriculture. Thus it was difficult to earn money therefore their income was used for this basis needs. Parents didn't have extra money to pay for the extra class.
- The Environment of the classroom were affected the economic condition of the school due to the poverty. There were many lacks of facilities.

From the above discussion of the related literature, a lot of studies have been carried around of mathematics achievement in different area of Nepal. According to above literature review have been done to explore whether the achievement in mathematics is affected by the different variables such as culture programme, parents occupations, environment of classroom, economic condition and gender. In the context of Nepal, different research on mathematics education shows that achievement level of boys student's is higher than the girls student's and achievement of private schools is

better than the public schools. There was very few study related to this area. There research was gap so to fulfil this gap the researcher to carry out the research topic.

Review of Thematic Literature

The main purpose of review of thematic literature is to find out what works have been done the area of the research problem under study and what has not been done in the field of the research study being undertaken. The review of thematic literature helps to make the concepts and theme clear for the study.

Historical Perspective

In 1875, Herbert Spencer argued that women were incapable of abstract thought and could not understand issues of justice, and only had the ability to understand issues of care. In 1925, Sigmund Freud also concluded that women were less morally developed in the concept of justice, and unlike men were more influence by feeling than rational thought. Early brain studies comparing mass and volumes between the sexes concluded that women were intellectually inferior because they had small and lighter brains. Many believed that the size difference caused women to be excitable, emotional, sensitive and therefore not suited for political participation.

Sex Difference in Intelligence

One study did find some advantages for women in later life while another found that male advantages on some cognitive tests are minimized when controlling for socio economic factors. The different in average I.Q between men and women are small in magnitude and consistent in direction although the variability of male score has been found to be greater than that of females result.

Current Research on General Intelligence

A study conducted by Jim-Flynn and Lilia Rossi-case (2011) found that men and women achieved roughly equal IQ scores on Raven's progressive Matrices after reviewing recent standardization samples in five modernized nation. Irwing (2012) found a 3 point IQ advantages for males in general intelligence from subjects ages 16-18 in the United States.

Likewise, in intelligence sector Maximum study were conducted and all studied shows that males and females do indeed each excel in abilities, mathematics and science might be an exception to this.(Source ;Wikipedia: Sex differences in intelligence –up dated on September 2016)

From the above discussion of the related literature we found that a lot of studies have been carried around the world as well as in Nepal in gender difference in overall mathematics achievement and in intelligence in difference ages and school level. In the context of Nepal the attitude of students towards mathematics has positive relationship. Teacher had negative attitude toward new curriculum of mathematics as well as they felt difficult to teach newly included topic without training. Among above literature researcher did not found any study on achievement of girls and boys in mathematics in Kailali district. Therefore this study conducted to investigate the achievement of boys and girls in mathematics.

Review of Theoretical Literature

There are so many theories which can be used to understand the learning. The theoretical discussion is needed for the interactive finding of the study. Many theories about learning and development of children such as classical conditioning , operant

conditioning, trial and error, social learning, social development, constructivism, cognitive learning, socio cultural, multiple intelligence and so on. Constructivism becomes one the possible theory to solve the problem of to compare the achievement of boys and girls in mathematics also to find the causes of low/high achievement in mathematics at secondary level.

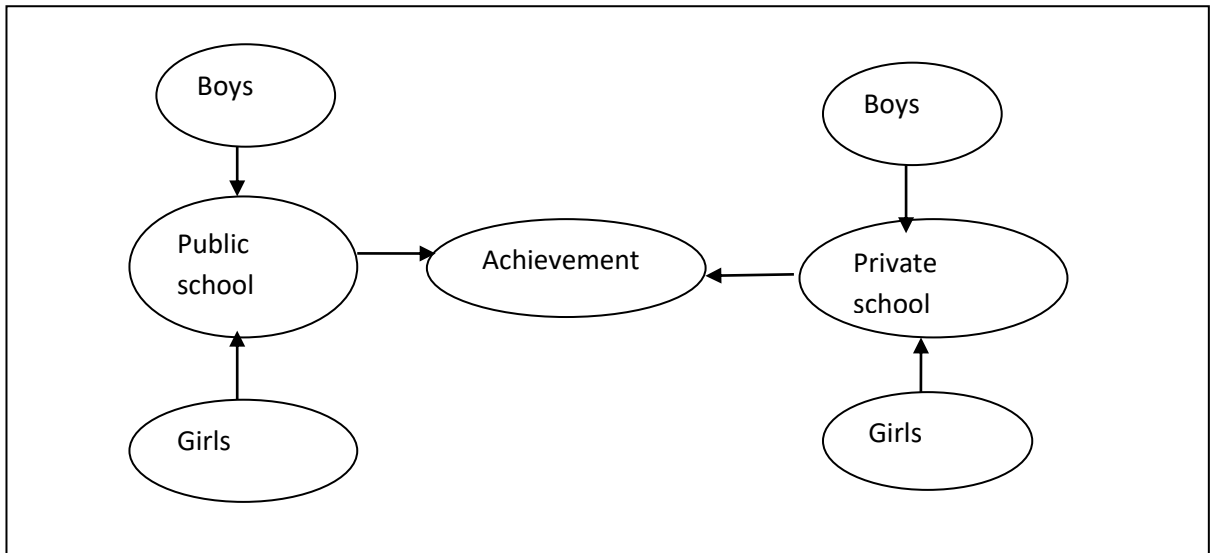
Constructivism

Constructivism is related to educational theory to deal with the problem of mathematics. Constructivist theory includes Vygotsky and Piaget, developmental psychologists who can contribute much of the framework to current constructivist theory. Vygotsky's basic premise is the all knowledge and knowledge making tools, such as language as symbolism, inherent to a community, actually reside within a socio historical context. This socio-historical context is viewed as the knowledge and beliefs that have been built over generations with the members of the community gradually accepting the knowledge and psychological framework of their group (Edwards, 2005). Additionally, Vygotsky finds the fundamental role of people, parents, peers and teachers posses in aiding children's learning from the earliest days. From this perspective learning is constructed jointly through social interaction and understanding can be enhanced with a connection established to what children know and can already do (Watson, 2000).

Conceptual Framework

This section deals about the conceptual framework for the researcher. This conceptual framework was established on the basis of research topic areas to fulfil the objectives of student's achievement in mathematics. The conceptual framework of the study was given below by the help of above mentioned literature review and the research proposal with related the topic.

Fig 1 - Conceptual Frame Work



These conceptual frameworks was showing the achievement of boys and girls in private and public school and compare their achievement in mathematics at grade X. Also causes of low and high achievement in mathematics. On the basis of above mentioned conceptual framework the tools were constructed such as achievement test paper and interview schedule. By using the tools the data were collected. Collected data was analyzed on the basis of conceptual framework.

Chapter-III

METHODS AND PROCEDURES

Research Methodology is a strategy which determines how the research becomes systematically complete. Research doesn't mean only collection of data of information also means the use of appropriate research method. This chapter presents the procedure of the study, which was carried out to achieve the objective of the study and get the answer of research question. This chapter includes design of the study, population, sample and sampling strategy, study area, data collection tools and techniques, data collection procedures, data analysis and interpretation procedure of data.

Design of the Study

Research design is way of the guideline of research to goal of the research and find out the solution of problem. This study was based on the mixed research design that especially concerns with sequential method. Mixed methods research is a methodology for conducting research that involves collecting, analyzing and integrating quantitative and qualitative research in a single study or longitudinal programme of inquiry. The purpose of this form of research is that both qualitative and quantitative research, in combination, provides a better understanding of a research problem or issue than either research approach alone. Explanatory sequential method is purpose of to use of qualitative approach, to explain quantitative results or to guide to form groups based on quantitative results. It is two-phase design. In this method collect quantitative and qualitative data at different time. The qualitative data depend on quantitative results.

Population of the Study

The population of the study was consists of total secondary school (171) in Kailali district. The samples of the students were selected from 6 sample schools of this study which were 3 private and 3 public schools. From each samples of school were selected total boys and girls students. Total sample students were 350 from 6 samples school.

Sample of the Study

Researcher was taken area of the Kailali district. I had selected 3 private and 3 public secondary schools. The study areas of the sample were selected by the clear in following table.

List of the Area of Sample Study

schools	Population	Sample of schools	Sample of students		
			Boys	Girls	Total
Public	98	3	113	125	238
Private	73	3	68	44	112
Total	171(1500)	6	181	169	350

Data Collection Tools and Techniques

Every study needs data collection tools and techniques. To collect the primary and secondary data for this study I had used one set of achievement test paper, interview and observation of mathematics class.

Reliability of Tools (Instrument)

Reliability is the necessary quality of research instrument. For the purpose of reliability of achievement test, I was taken the pilot achievement test to 18 students enrolled in grade X of Lotus Higher Secondary School in Kailali district. By using split half of subdivided method also using Karl Pearson's method coefficient of correlation (r) was calculated. The value of split half of the test (r_{XY}) was found 0.914 also then the reliability of the whole test (R_{XY}) was found 0.96.

Karl Pearson's correlation coefficient is a linear correlation coefficient that returns a value of between -1 and +1. A -1 means there is a strong negative correlation and +1 means that there is strong positive correlation. A 0 means there is no correlation. The interpreting values of Karl Pearson's correlation coefficient(R) is following

R value =	define of R values
+0.70 or higher	Very strong positive relationship
+0.40 to +0.69	Strong positive relationship
+0.30 to +0.39	Moderate positive relationship
+0.20 to +0.29	Weak positive relationship
+0.01 to +0.19	No or negligible relationship

0	No relationship
-0.0 to -0.19	No or negligible relationship
-0.20 to -0.29	Weak negative relationship
-0.30 to -0.39	Moderate negative relationship
-0.40 to -0.69	Strong negative relationship
-0.70 or higher	Very strong negative relationship

But the reliability of whole test was lies above the +0.70 which indicates the very strong positive relationship of tools. The reliability of whole test was finding of correlation(R) = +0.96.

Validity of Tools (Instrument)

Validity is important in achievement test. The numbers of question were determined to meet the objectives. The related contents were examined carefully. The content validity of the test was established by items approval from the mathematics school teachers and supervisor who had guided to the researcher.

Data Collection Procedures

The researcher was used primary and secondary data. Secondary data was collected from the District Education Office Kailali and website (www.moe.gov.np). In addition, primary data was obtained by implementing the mathematics achievement test to the students of the sample schools also interview who had received low and high achievement marks in mathematics. It was impossible to conduct the test in all schools at the same time so that the test was conducted in 6 sample schools of total

students in class 10 at different schedule. Then the researcher was determined the private and public school of students. To collect the primary data, at first researcher was selected some schools as sample. After selecting the sample schools, the researcher was visited all these schools to collect data.

Before conducting test in each school the researcher was met with the authorities (Principal, Vice Principal, Exam coordinator) and explained the purpose of the visiting school in details. Regarding that researcher was provided them recommendation letter given by the Central Department of Education Mathematics of T.U. Kirtipur. Also researcher requested them to provide 2/3 period of mathematics from each sample school after researcher got permission through the authorities from each school. The researcher was taken the exam with 20 marks of total students in class 10. Before the exam researcher explained about the exam of multiple choice item of mathematics and time allocate for completing the test. Total number of sample had 6 schools with 350 students of class 10. Then researcher was provided to student multiple choice questions to test their knowledge after the students had finished 30 minutes of exam. And answer sheet were collected also check with scoring by the researcher. Next day researcher was taken the interview of students who had received low and high marks in achievement test also to find the causes of low and high marks in mathematics by interview class observation of mathematics. I took interview with 18 high achiever students and 18 low achiever students.

Data Analysis and Interpretation Procedure

The data were collected from the different ways. The different data were collected from achievement test and interviewing the students of mathematics class. The set of collected data (obtained marks) of student achievement test was categorized

and presented in tables for analyzed. The scores of 350 students were analyzed to fulfil the objectives of this study. Different students of score marks which were categorized and presented into different tables by using mean, standard deviation, variation and T-test. T-test was used to find the significance difference between achievement of girls and boys in mathematics. For the hypothesis test, T-test was applied at the 0.05 level of significance (i.e. at 95% Confidence level). Also I had analysed the causes from interview of student who had received low and high achievement in mathematics by linking the theory of constructivism.

Chapter: IV

ANALYSIS AND INTERPRETATION OF RESULT

The data analysis and interpretation is the process of systematic presentation of results which searched and arranged the data. The data of the study was collected from the boys and girls student who were studying at grade X in kailali district of mathematics. The collected data were tabulated and analyzed to achieve the objectives and verification of the hypothesis. This chapter deals with the statistical analysis and interpretation of data obtained by the sample students in the achievement test and interview of low and high received marks in mathematics and observation of mathematics class as well as summary of the finding of the study. The collected data were tabulated and analyzed by calculating mean, Standard deviation, variance and t-test at the 0.05 level of significance and also the researcher taken the interviews of the student and observation of mathematic class. The collected information of achievement test, interview and observations of class was analyzed and interpreted under the following section separately.

- Comparison of achievement scores of boys and girls student of public schools in mathematics.
- Comparison of achievement scores of boys and girls student of private schools in mathematics.
- Comparison of achievement scores of boys students of private schools and girls students of public schools in mathematics
- Comparison of achievement scores of boys students of public schools and girls students of private schools in mathematics.

- Comparison of achievement scores of total boys and total girls students in mathematics.
- To find the causes of low and high achievement in mathematics.

Comparison of Achievement Scores of Boys and Girls Students of Public School in Mathematics

The score of achievement test obtained by boys students and girls students were analyzing and interpretation to compare the mean achievement scores between boys and girls students at grade X in mathematics. The mean, standard deviation, variance and t- test value of score obtained by 113 boy's students and 125 girl's student of public schools were presenting in the table 1.

Table No. 1

The Achievement of Boys and Girls Students of Public School in Mathematics

Group compared	Sample size	Mean	Standard deviation	Variance	T- test	T-table value	Conclusion
Boys of public school	113	11.50	3.56	12.67	8.84	1.64	Reject H_0 , There was significance difference between boys and girls
Girls of public school	125	12.74	3.52	12.39			

The above table 1 shows the comparison of the achievement score in mathematics between boys and girls students of public school. The given table represented that the total number of the boys students were 113 and girls students were 125. The mean value of boys and girls students were 11.50 and 12.74 respectively, it showed that the mean achievement of boys were 1.24 higher than the girls students. The standard deviation of boys and girls students were 3.56 and 3.52 respectively, it showed that the standard deviation of boys were 0.04 higher than the girls students. The variance of boys and girls students were 12.67 and 12.39 respectively, it showed that the variance of boys were 0.28 higher than the girls students. Two mean achievements of boys and girls students were compared statistically by using t-test with two tail at the 0.05 level of significance. . The calculated t- value is 8.84 where as tabulated value was 1.64. This lies in the critical region. Hence the null hypothesis H_0 was rejected and alternative hypothesis was accepted. There was significance difference between the boys and girls students of public school in mathematics at kalilali district.

**Comparison of Achievement Scores of Boys Students and Girls Students
of Private Schools in Mathematics**

The score of achievement test obtained by boys students and girls students were analyzing and interpretation to compare the mean achievement scores between boys and girls students at grade X in mathematics. The mean, standard deviation, variance and t value of score obtained by 68 boy's students and 44 girl's students of private schools were presenting in the table 2.

Table No. 2

**The Achievement Scores of Boys and Girls Students of Private Schools in
Mathematics**

Group compared	Sample size	Mean	Standard deviation	Variance	T-test	T-table value	Conclusion
Boys of private school	68	17.02	2.12	4.49	1.73	1.64	Reject H_0 , There was no significance difference between boys and girls
Girls of private school	44	16.80	2.69	7.23			

The above table 2 shows that the mean score of boys and girls students of private schools were 17.02 and 16.80 respectively in full marks 20. Therefore the mean score of boys students were higher than the mean score of girls students by 0.22. The standard deviation score obtained by boys students and girls students of private schools were 2.12 and 2.69 respectively. Therefore the standard deviation of boys students were less than the standard deviation of girls students by 0.57. According to the table the variance of boys and girls students were obtained by 4.49 and 7.23 respectively. Therefore the variance of girls was higher than the boys students by 2.74 in private schools. By using t- test with two tails for the comparing of the students mean achievement at the 0.05 level of significance. The calculated t- value was 1.73 where as tabulated value was 1.64. This lies in critical region. Hence the null

hypothesis H_0 was rejected. There was significance difference between the boys and girls students of private school in mathematics at kalilali district.

Comparison of Achievement Scores of Boys Students of Private Schools and Girls Students of Public Schools in Mathematics

The scores of achievement test obtained by boys students of private schools and girls students of public schools were analyzing and interpretation to compare the mean achievement scores between boys and girls students at grade X in mathematic. The mean, standard deviation, variance and t- test value of score obtained by 68 boys students of private and 125 girls students of public schools were presenting in the table 3

Table No. 3

The Achievement Scores of Boys Students in Private and Girls Students of Public Schools in Mathematics

Group compared	Sample size	Mean	Standard deviation	Variance	T- test	T-table value	Conclusion
Boys of private school	68	17.02	2.12	4.49	10.54	1.64	Rejected H_0 , There was significance difference between boys and girls
Girls of public school	125	12.74	3.52	12.39			

The above table no. 3 showed that the mean score of boys students in private school was 17.02 and mean scores of girls student of public schools was 12.74 in full marks 20. Therefore the mean score of boys was higher than girls students by 4.28. The standard deviation of boys students of private schools and girls students of public schools were 2.12 and 3.52 respectively. The standard deviation of boys student of private school was smaller than the girls students of public schools by 1.40. And also the variance of boys students in private schools and girls students of public schools were 4.49 and 12.39 respectively. It showing that boys students of private schools were lower than girls student of public schools students by 7.90. The two means achievements of boys and girls students were statistically compared by using t- test with two tailed at the 0.05 level of significance. The calculated t value 10.54 was greater than the tabulated value 1.64. Hence the null hypothesis H_0 was rejected and alternative hypothesis H_1 was accepted. It concluded that there was significance difference between the boys students of private schools and girls students of public schools in mathematics at Kailali district.

Comparison of Achievement Scores of Boys Students of Public Schools and Girls Students of Private Schools in Mathematics

The score of achievement test obtained by boys students of public schools and girls students of private schools were analyzing and interpretation to compare the mean achievement scores between boys and girls students at grade X in a mathematic. The mean, standard deviation, variance and t- test value of score obtained by 113 boy's students and 44 girl's students of private schools were presenting in the table 4.

Table No. 4

**The Achievement Scores of Boys in Public and Girls Students of Private Schools
in Mathematics**

Group compared	Sample size	Mean	Standard deviation	Variance	T- test	T-table value	Conclusion
Boys of public school	113	11.50	3.56	12.67	-10.09	-1.64	Rejected H_0 , There was significance difference between boys and girls
Girls of private school	44	16.80	2.69	7.23			

The above table 4 showed the comparison of the achievement score in mathematic between boys and girls students of public and private schools respectively. The given table represented that the total number of the boys students were 113 and girls student were 44. The mean value of boys and girls students were 11.50 and 16.80 respectively, it showed that the mean achievement of boys were 5.30 lower than the girls students. The standard deviation of boys and girls students were 3.56 and 2.69 respectively, it showed that the standard deviation of boys were 0.87 higher than the girls students. The variance of boys and girls students were 12.67 and 7.23 respectively, it showed that the variance of boys were 5.44 higher than the girls students. Two mean achievements of boys and girls students were compared statistically by using t-test with one tailed at the 0.05 level of significance. . The calculated t- value was -10.09. This value lies in the critical region. Hence the null hypothesis H_0 was rejected and alternative hypothesis was accepted. There was

significance difference between the boys students of public schools and girls students of private schools in mathematics at Kailali district.

**Comparison of Achievement Scores of Total Boys and Total Girls
Students in Mathematic**

The scores of the achievement test obtained of boys and girls students were analyzed and interpretation to compare mean achievement scores between boys and girls students at grade X in mathematics. The mean, standard deviation, variance and corresponding t value of the scores obtained by boys and girls students were presenting in the following table no.5

Table No. 5

**Comparison the Achievement Scores of Total Boys Students and Total Girls
Students in Mathematics at Kailali District**

Group compared	Sample size	Mean	Standard deviation	Variance	T- test	T-table value	Conclusion
Boys of total schools	181	13.60	4.08	16.64	-0.44	-1.64	Accepted H_0 , There was no significance difference between boys and girls
Girls of total school	169	13.80	4.44	19.75			

The above table no. 5 showed that the mean scores of boys students were 13.60 and mean scores of girls student were 13.80 in full marks 20. Therefore the mean

score of boys were lower than girls students by 0.20. The standard deviation of boys students and girls students were 4.08 and 4.44 respectively. The standard deviation of boys students were smaller than the girls student by 0.36. And also the variance of boys students and girl student were 16.64 and 19.75 respectively. It showing that boys students were lower than girls students by 3.11. The two means achievements of boys and girls students were statistically compared by using t- test with one tailed at the 0.05 level of significance. The calculated t value 0.44 was lower than the tabulated value 1.64. Hence the null hypothesis H_0 was accepted and alternative hypothesis H_1 was rejected. It concluded that there was no significance difference between the boys students of private schools and girls students of public schools in mathematics at kailali district.

Causes of Low and High Achievement in Mathematics

The interview was applied to collect the information about the causes of low and high achievement in mathematics. The mathematics class room of grade X were observed by researcher and also was taken interview of different capacities of students who received the low and high marks in achievement test of mathematics. In the interview and class observation the researcher was found the following causes of low and high achievement in mathematics.

School Environment

The area in which school is situated is called school environment. Most of the schools had cleaned environment. Most of the school students were from the society of Chetteri, Brahman, Dalit, Chaudhary and Rana etc. This society had own norms and values which effect the school environment to get the achievement in mathematics.

The researcher had found mathematics teachers punctual in class. In the classroom teacher focused on boys and talent students of public school. In private schools teacher focused on total students of class. The teaching materials managed by school. Total sample school had library facility also manage the extra class of private school only. The class work and homework checking system was little in public school. In both systems of schools the relationship between teacher and student was very good.



Interview was taken with the students of public and private schools who received the low marks in achievement test of mathematics. The received versions by the researcher was following

There is lack of math books in library also there is not sufficient to study for related topic of mathematics because of time is limit

Low receiver students

I am feeling weak in mathematics study so I am not interested in mathematics.

Low receiver students

When I am studying mathematics then I have created many problems.

Low receiver students

From the above view of low achiever students had many problems for learning of mathematics. There was lack of mathematics books in library of public and private schools. Some students were feeling weak in mathematics subject. Piaget's research and theory is constructivism states that maintain the children acquire number concepts and operations by construction from the inside and not by internalization. Piaget (1968) pointed out that every normal student is capable of good mathematical reasoning if attention is directed to activities of his interest and if by this method the emotional inhibitions that too often give him a feeling of inferiority in lesson of mathematics are removed.

Piaget suggest that when children do not understand or have difficulty with a certain concept. It is due to a too-rapid passage from the qualitative structure of the problem, mathematical formulation and environment. Conditions that can help the child in his search for understanding according to Piaget is the use of active methods that permit the child to explore spontaneously and require that "new truths" be learned, red is covered or at least reconstructed by the student not simply told him (Piaget1968).Constructivism is a focusing on the way of people create meaning through a series of individual constructs or experiences. It place emphasis on providing a learning environment. Where students can explore, test and acquire new knowledge on their own. Each student creates their own mental models to deal with

new information and experience. So school environment is one cause of low achievement in mathematics.

Interviews were taken with the students of public and private schools who received the high marks in achievement test. The received versions by the researcher was following

I think practice make students to achieve better marks so I am focusing on more practices.

High receiver students

Teacher doesn't use sufficient teaching materials in teaching us. So I am deep studying in mathematics.

High receiver students

In my school there are no sufficient teaching materials. Class size is too large and teaching content of mathematics is more so teacher unable use teaching materials daily. So I am emphasizing in mathematics.

High receiver students

These above view of students show that students were more honourable, laborious study for taking better result. Students were showing the focus on the study. Also above view were showing the different problems of schools like there were no sufficient teaching materials, large class size and mathematics teacher didn't teach all the contents by teaching materials so students were hard working to receive the good marks of mathematics. Constructivism believes that a learner's ability to learn relies to

a large extends on what he already knows and understands and the acquisition of knowledge should be an individually tailored process of construction by school environment.

Lev Vygotsky described a zone of proximal development (ZPD). He theorised that a low level of skill can be reached by a child working independently. A high level of skill is possible when working with a skilled instructor. In other words, a child can reach beyond their maturational level with assistance from others by help of environment. John Dewey argued that learning is interring active and social process. He believed that students engaged in school environment where they are active learning. Experiential learning involves students in exploring thinking and reflecting through real world experiences. So these above view of students show that school environment is a cause of high achievement in mathematics.

Economic Condition

Economic condition plays the vital role in cause of low and high achievement in mathematics. Some of students were poor in economic condition. They didn't engage the tuition classes so they didn't do better in mathematics test. Some of students were rich in economic condition. They engaged in tuition classes so they had received the good marks in mathematics test. In poor family they have created many problems for the study. These problems haven't solved in poor family in daily life. Rich family have easily solved the problems in daily life.

Interview was taken with the students of public and private schools who received the low marks in achievement test of mathematics. The received versions by the researcher are following

I am very poor in economic condition. So I have many problems to study. When I go to home from school then I was engaged other activities so that I am weak in Mathematics.

Low receiver students



I haven't good economic condition because no one in job holder in my family so that I am very hard to afford for education. .

Low receiver students

The above view of students shows that most of students were different categories of family of economic status in same class. They were very poor economic condition so they were engaged in different work in house. Economic condition play an important role in their student's learning.

Analysis of the PISA 2000 results which focused mainly on Achievement found that students from higher socio-economic families tended to show stronger achievement skills. The same result was found for PISA 2003 students from families with higher socio-economic status also tended to perform better in mathematics. So these above view of students show that economic condition is a cause of low achievement in mathematics.

Interview was taken with the students of public and private schools who received the high marks in achievement test of mathematics. The received versions by the researcher are following

I am doing more practises in mathematics at home because I haven't problem in my house. So I have received good marks in mathematics.

High receiver students

I like mathematics subject because I know the all problems of mathematics subject.

High receiver students

From the above view of high receiver students were do more practise in mathematics study at home. They were not problem in house so they didn't have any struggle for economic status. They had many facility in their in their home. They did not affect other problems in study. The role of economic condition in the achievement of students was positive. So it is concluded that economic condition of student's had one cause of high achievement in mathematics.

Attitudes Towards Mathematics

There should be positive think between the learner and teacher about of mathematics. Both of them should have interest towards learning mathematics. Then the mathematics achievement will be effective. When I observed the class I found some students felt mathematics as a bored subject. Some schools there were not extra time to students from teacher side. Some schools students were passive and classes were silent in study time. Public schools students only finished their homework but they didn't work seriously and practice extra exercise. There were not motivating activities to students. In private school students were engaged in extra exercise and had finished homework totally. They feeling mathematics subject was easy to learn than other subjects.

Interviews were taken with the students of public and private schools who received the low marks in achievement test of mathematics. The received versions by the researcher are following

Teacher doesn't teach us with pre-requisite knowledge so we feel mathematics is a hard subject than other subject.

Low receiver students

I have no interest in mathematics but interest in Nepali because mathematics is very hard.

Low receiver students

From the above view of low achiever students had many problems for learning of mathematics. Teacher was not taught the students with pre-requisite knowledge.

Some students were not interest in mathematics but interest in Nepali. Low receiver students felt mathematics was hard subject than other subject. So first teacher must provide forums for students to become familiar with the material students are learning in school as well as the way they are taught the material, the underlying concepts behind what is being taught and teacher role in supporting the school instructional program when students do their activities like homework, class activities etc.

This support should be both substantive and emotional. Teachers need to be able to student's question and know what children are expected to do. Teacher who has very limited educational background students can be help. Constructivism involves the process of questioning, exploring and reflecting of mathematics. This theory says that learners should construct of mathematics their own understanding and knowledge of the world through varied experiences. By reflecting on these experiences, students assimilate useful information and create personal knowledge of mathematics.

The negative attitudes towards mathematics was due to existing learning methods that discouraged participation as well as unfounded believes that mathematics was a difficult subject. Teachers, fellow students and parents also contributed to formation of attitudes. If the mentioned have negative attitudes themselves the study will find that they are same on the learner towards mathematics. So an attitude towards mathematics is a cause of low achievement in mathematics.

Interview was taken with the students of public and private schools who received the high marks in achievement test of mathematics. The received versions by the researcher are following

Teacher use learner's centred instruction to solve the mathematical problem in different ways with the help of example and non example. So I received good marks in mathematics.

High receiver students

Teacher gives extra time to improve mathematics according to weak, moderate and talent students.

High receiver students

From the above view of high receiver students were satisfied the learning style of mathematics teacher. In class time mathematics teacher used learners centred instruction to solve the mathematical problem in different ways with the help of example and none example. And teacher gives extra time for study of mathematics according to weak, moderate and talent students. So students received the good marks in mathematics.

There is a need for teachers and all education stakeholders to enhance positive attitudes towards mathematics as a subject as well as enhancement of quality teaching of the subject. Also learning experiences provided in the classrooms should include such activities which provide opportunities for students to participates, bring out analogy, to draw inferences arrive at generation and so on. So we say that an attitude towards mathematics is one cause of achievement in mathematics.

Role of Parents

Parents are great role in achievement of mathematics. Parent's participation is increasing in children's learning process. When I observed the class most of the

parents sent their children to schools. In public school most of the students were coming from poor family background. Their parents were busy in their work so they sometime participate in school. In private school most of the students were coming from rich family background. Their parents were participating in school for extra programme. Their parents tried to know about of student's behaviour, learning and extra activities. Some parent's role was active or passive in both types of school.

Interview was taken with the students of public and private schools who received the low marks in achievement test of mathematics. The received versions by the researcher are following

Parents give less time for me to the subject and extra information about the subject matter because my parents have busy out of home. .

Low receiver students

Parents give me motivation for better achievement in study. So I am laborious in mathematics study. But I am weak in mathematics than other subjects. .

Low receiver students

From the above view of low receiver students had many problems for learning of mathematics. Parents of low receiver students didn't give the lot of time at home for homework and extra time of subject matter. Some parents of low receiver student's gave the motivation for better achievement in mathematics in spite of them didn't progress in mathematics. Low income parents are overstressed in trying to meet the daily needs of their families.

The resulting depression and negatively often lead to insufficient nurturing disengaged parenting and a difficulty in focusing on the needs of children (Emery and Lawman-Billings, 1998). Lower levels of parent's education and occupation are related with achievement of children in mathematics subject. So analysis of above view we can say that role of parents is one causes of low achievement in mathematics.

Interview was taken with the students of public and private schools who received the high marks in achievement test of mathematics. The received versions by the researcher are following

Parents give encourage me to do best result of exam so I am hard work at home. I always follow the parents view.

High receiver students

Parents do behave all children are equally. I have two brothers and one sister.

Parents love us by complete our needs.

High receiver students

From the above view of high receiver students were satisfying the parent's role. Parents were encouraged to child for best result of mathematics. All behave was equally to children by parents. The children were satisfied the parent's behave. So students got good marks in mathematics.

Piaget said that it is always through the external educational action of family surroundings that the young child learners language, which Piaget (1973) called is an "expression of collective values". Piaget pointed out that without external social transmission the continuity at collective language remains practically impossible.

There are three types of feelings or emotional tendencies, according to Piaget that affect the ethical life of the child, that are first found in his mental constitution. In the first place is the need for love of parents, which plays a basic role in development in various forms from the adolescence. There is feeling of fear of those who are bigger and stronger than himself. So analysis of above view of students we can say that role of parents is one cause of high achievement in mathematics.

Teaching Learning Process

Teaching learning process is the heart of achievement in mathematics. On it is depends the fulfilment of the aims and objective of mathematics. A number of students require support to meet the objectives of the prescribed mathematics curriculum. This support may be in the form of changes in teaching strategies, approaches, materials and may require the support of resource. In teaching learning process teachers must be punctual and follow the rule of school and society. A student centred approach which activity engaged the math students in the learning process. When I observed the class then I got some teachers using student centred method, teacher centre method, asking the question help of subject matter and also students were giving the answer. Teacher's teaching style was using the co-operative.

Interviews were taken with the students of public and private schools who received the low marks in achievement test of mathematics. The received versions by the researcher are following

Sometimes mathematics teacher is angry with me because I haven't done daily homework so I am weak in mathematic subject only.

Low receiver students

Mathematics teacher divides us into two groups good and poor. I am lying in poor group and feeling sad also other students tease us.

Low receiver students

From the above view of low receiver students had many problems for better achievement in mathematics. Students view were showing that sometimes mathematics teacher was angry with weak students. Students were divided into two groups like weak and good by mathematics teacher. Weak students were feeling hard subject of mathematics because mathematics teacher used the teacher centred method.

John Locke (1632-1704) offered the “blank slate” theory where humans are born into the world with no innate knowledge. He recognized that something had to be present. This something to John Locke seemed to be mental powers. Locke views these as a biological ability the baby is born with, similar to how a baby knows how to biological function when born. So as soon as the baby enters the world, it immediately has experiences with its surroundings and all of those experiences are being transcribed to the babies “Slate”. All of the experiences are eventually cultivate into complex and abstract ideas. This theory can still help teachers understand and teaching learning process in mathematics.

Social contribution demands that the learners should play an active role in the learning process. It also emphasis on more student centred approach in classroom but the school hasn't adopted this approach of classroom teaching. So according the analysis of students view we can say that teaching learning process is one cause of low achievement in mathematics.

Interviews were taken with the students of public and private schools who received the high marks in achievement test of mathematics. The received versions by the researcher are following

Mathematics teacher give us homework daily .So I study in mathematics at home to complete the mathematics homework daily.

High receiver students

Mathematics teacher easily explains about the teaching lesson by using the effective teaching materials so I can easily learn mathematics of any topics.

High receiver students

From the above view of high receiver students were satisfied the learning style and giving the homework by mathematics teacher. Teaching learning style or theory can be used in four sectors according to Claxton and Murrell (1987).

- Personality model-refers to an individual's personality such as introverted/extroverted, thinking/feeling and judging/perceiving.
- Information processing models- refers to channels on models of communications used by learners such as visual, verbal, auditory and kinaesthetic.
- Social interaction model- refers to how learning is impact by contexts.
- Instruction preference models- refer to how learners deal with different teaching methods such as lecture or discussion.

John Dewey was a psychologist and educational reformer who argued that learning is an interactive and social process He believed that students thrive in environments

where they are in active learners. Experiential learning involves students in exploring, thinking and reflecting through real world experiences. Teaching learning process propose that individuals learn in different ways that there are distinct learning styles and that knowledge of a learner's preferred.

Learning style will lead to faster and more satisfactory improvement. Social construction says that motivation and teaching style are the keys of teaching learning process which makes classroom more interesting and encouraging. Teacher should become a facilitator in the classroom and provide positive reinforcement. The positive reinforcing is always emphasizing in good learning. Constructivism says that the learners should play an active role in the learning process also it emphasis on more student centred approach in classroom. The high receiver students were taking this process. Analysis of high receiver students we found teaching learning process is one cause of high achievement in mathematics subject.

In brief the research declares that the mean achievement of boy students is less than the girl students in mathematics by 0.2. Also the major causes of low and high achievement in mathematics are school environment, economic condition, attitudes towards mathematics, role of parents and teaching learning process in Kailali district of class X.

Chapter V

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

After the analysis and interpretation of collected data an attempt has been made to summarize the findings and recommendations for the further study. The first section of this chapter presents the summary of the research, second section presents findings, third section presents conclusions and fourth section presents recommendations for further study.

Summary of the Study

Mathematics plays vital role in individual life because it helps to find out the solution of any daily life problem. Students can use mathematical concepts and logical reasoning to solve the daily problem. Mathematics is useful in every aspect of human life. The sudden changes of science and technology weren't possible without mathematics. Mathematics takes an important role in our school level curriculum in class X. So that researcher conduct this study to compare the achievement of boys and girls students in mathematics and to find the causes of low and high achievement in mathematics at grade X in kailali district. To fulfil the objectives the researcher used mixed research design and explanatory sequential method.

The researcher used achievement test paper, interview of students who received low and high marks in mathematics and also class observation of mathematics in class X. Researcher took achievement test paper by consisting 20 multiple choice questions that covered text book and practice book of mathematics in class X. The population of the study was all the students of kailali district who studied at private and public schools in class X. The researcher used total students selected

from 6 sample schools. There are 3 private and 3 public schools and also there are 350 total students in class X. To propose the collecting data researcher visited each of the samples school also informed the purpose of study to all principals and voice principals of the samples schools. Researcher got permission from the samples school to take achievement test, interview and class observation of class X. At first researcher took achievement test paper with time allocated 30 minutes for all students. After answer sheets collected and scored in test by researcher. The achievement test was analyzed by using mean, standard deviation, variance and two tailed t- test at the 0.05 level of significance. The researcher had taken the interview who received the low and high marks in mathematics. 36 students were taken the interview of mathematics students. At last I had observed the class in mathematics to fulfil the objectives.

Findings of the study

With the quantitative and qualitative analysis the following results were the findings of the study.

- In public school the mean achievement of boys students was less than the mean achievement of girls students in mathematics by 1.24. Hence there was significance difference between the achievement of boys and girls students of public schools in mathematics at the 0.05 level of significance.
- In private schools the mean achievement of bosy students was more than the mean achievement of girls students in mathematics by 0.22. Hence there was significance difference between the achievement of boys and girls students of private schools in mathematics at the 0.05 level of significance.
- The mean achievement of boys students of private schools was greater than the mean achievement of girls students of public schools in mathematics by

4.28. Hence there was significance difference between the achievement of the boys students of private schools and girl students of public schools in mathematics at the 0.05 level of significance.

- The mean achievement of boys students in public schools was less than the mean achievement of girls students of private schools in mathematics by 5.3. Hence there was significance difference between the achievement of boys students in public schools and girls students in private schools in mathematics at the 0.05 level of significance.
- In overall the mean achievement of boys students was less than the mean achievement of girls students in mathematics by 0.2 of kailali district. Hence there is no significance difference between the achievement of boys and girls students in mathematics at grade X of kailali district.
- Researcher found that school environment, economic condition, attitudes towards mathematics, role of parents and teaching learning process had causes of low and high achievement in mathematics.

Conclusions of the Study

The statistical analysis of achievement test paper of class X in mathematics varies between boys and girls students. Mathematic subject has been an important subject in curriculum of all level of schools and university level. But most of the students fail in mathematics. Some students have good marks and some students were poor marks in mathematics. What are the causing factors make that type of result in mathematics. From the finding of this study mean achievement of boys students were less than the girls students by 0.2 of kailali district. So from the result of t-test at the 0.05 level of significant was concluded that there was no significant difference

between the achievement of boys and girls students of kailali district. Except this conclusion researcher found another one reality that low and high achievement in mathematics was not cause on the achievement in gender but it depends on other causes like school environment, economic condition, attitudes towards mathematics, role of parents and teaching learning process. Researcher found that high achiever students were done daily homework and also follow the teacher's instructions. But low achiever students weren't done daily homework and also didn't follow the teacher instruction.

Recommendations for Further Study

The conclusion of this study cannot be generalizing to all areas and all schools students in Nepal because its limitation was students of grade X in kailali district. Considering the limitation and analyzing the conclusion the researcher has made the following recommendation and suggestion for further study.

- The study was limited to 6 secondary schools of kailali district. To get more valid and reliable test should be done all secondary schools of kailali district in class X.
- A similar study can be done for other classes and other subjects in wider scope and large sample.
- Schools should manage extra-classes for low achiever students in mathematics subject.
- Teacher should give emphasis on practical work of mathematical concepts which are useful in everyday life and good for better achievement in mathematics.
- To identify the other causes of low and high achievement in other subject.

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APPENDIX A

Name of Sample Schools of this Study	
Public schools	Private Schools
Shree DurgaLaxmi Higher Secondary School.	Shree Everest Academy Higher secondary School
Shree Guhyeshwari Secondary School.	Shree Sadna Path Academy secondary school.
Shree Saileswari Higher Secondary School.	The National Academy Secondary School.

APPENDIX B

Compare the Achievement Scores of Boys and Girls Students of Public Schools in Mathematics

1. The null hypothesis and alternative hypothesis were:

$H_0: \mu_1 = \mu_2$ there was no significance difference between achievement of boys and girls students of public school in mathematics.

$H_1: \mu_1 \neq \mu_2$ there was significance difference between achievement of boys and girls students of public school in mathematics.

2. Level of significance: $\alpha = 0.05$

3. Critical region: Since the samples were compared group, we used t statistic.

Where $t_{\alpha, n_1 + n_2 - 2} = t_{0.05, 238} = 1.64$

I.e. we reject the null hypothesis if $t \geq 1.64$

4. Computation:

We have $n_1 = 113, \bar{X}_1 = 11.50, \sigma_1 = 3.56, \sigma_1^2 = 12.67$

$n_2 = 113, \bar{X}_2 = 12.74, \sigma_2 = 3.52, \sigma_2^2 = 12.39$ where 1 denotes boy

and 2 denotes the girl students.

Compute,

$$t = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_1)}{\sqrt{\frac{(\sigma_1)^2}{n_1} + \frac{(\sigma_2)^2}{n_2}}}$$

$$t = \frac{11.50 - 12.74}{\sqrt{\frac{12.67}{113} + \frac{3.52}{125}}}$$

$$t = \frac{1.24}{0.14016} = 8.847$$

5. Decision: Since $8.85 > 1.64$. Reject H_0 . Hence we conclude that there was a significance difference between achievement of boys and girls students of public schools in mathematics at 0.05 levels of significance.

APPENDIX C

**Compare the Achievement Scores of Boys and Girls students of Private Schools
in Mathematics.**

1. The null hypothesis and alternative hypothesis were:

$H_0: \mu_1 = \mu_2$ there was no significance difference between achievement of boys and girls students of public school in mathematic.

$H_1: \mu_1 \neq \mu_2$ there was significance difference between achievement of boys and girls students of public school in mathematic.

2. Level of significance: $\alpha = 0.05$

3. Critical region: Since the samples were compared group, we used t statistic.

Where $t_{\alpha, n_1 + n_2 - 2} = t_{0.05, 112} = 1.64$

I.e. we reject the null hypothesis if $t \geq 1.64$

4. Computation:

We have $n_1 = 68, \bar{X}_1 = 17.02, \sigma_1 = 2.12, \sigma_1^2 = 4.49$

$n_2 = 44, \bar{X}_2 = 16.80, \sigma_2 = 2.69, \sigma_2^2 = 7.23$ where 1 denotes boys and

2 denotes the girls students.

$$\text{Compute, } t = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_1)}{\sqrt{\frac{(\sigma_1)^2}{n_1} + \frac{(\sigma_2)^2}{n_2}}}$$

$$t = \frac{17.02 - 16.80}{\sqrt{\frac{4.49}{68} + \frac{7.23}{44}}}$$

$$t = \frac{0.22}{0.127}$$

$$t = 1.73$$

5. Decision: Since $1.73 > 1.64$. Rejected H_0

Hence we conclude that there was significance difference between achievement of boys and girls students of public schools in mathematics at 0.05 levels of significance.

APPENDIX D

Compare the Achievement scores of Boys Students of Private Schools and Girls Students of Public Schools in Mathematics.

1. The null hypothesis and alternative hypothesis were:

$H_0: \mu_1 = \mu_2$ there was no significance difference between achievement of boys students of private schools and girls students of public schools in mathematic.

$H_1: \mu_1 \neq \mu_2$ there was significance difference between achievement of boys students of private schools and girls students of public school in mathematic.

2. Level of significance: $\alpha = 0.05$

3. Critical region: Since the samples were compared group, we used t statistic.

Where $t_{\alpha, n_1 + n_2 - 2} = t_{0.05, 191} = 1.64$

I.e. we reject the null hypothesis if $t \geq 1.64$

4. Computation:

We have $n_1 = 68, \bar{X}_1 = 17.02, \sigma_1 = 2.12, \sigma_1^2 = 4.49$

$n_2 = 125, \bar{X}_2 = 12.74, \sigma_2 = 3.52, \sigma_2^2 = 12.39$ where 1 denotes boys

and 2 denotes the girl students.

Compute,

$$t = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_1)}{\sqrt{\frac{(\sigma_1)^2}{n_1} + \frac{(\sigma_2)^2}{n_2}}}$$

$$t = \frac{17.02 - 12.74}{\sqrt{\frac{4.49}{68} + \frac{12.39}{125}}}$$

$$t = \frac{4.28}{0.406}$$

$$t = 10.54$$

5. Decision: Since $10.54 > 1.64$. Rejected H_0 . Hence we conclude that there was significance difference between achievement of boys students of private schools and girls students of public school in mathematics at 0.05 levels of significance.

APPENDIX E

Compare the Achievement Score of Boys Students of Public Schools and Girls Students of Private Schools in Mathematics.

1. The null hypothesis and alternative hypothesis are:

$H_0: \mu_1 = \mu_2$ there was no significance difference between achievement of boys students of private schools and girls students of public schools in mathematic.

$H_1: \mu_1 \neq \mu_2$ there was significance difference between achievement of boys students of private schools and girls students of public school in mathematics.

2. Level of significance: $\alpha = 0.05$

3. Critical region: Since the samples were compared group, we used t statistic.

Where $t_{\alpha, n_1 + n_2 - 2} = t_{0.05, 155} = 1.64$

I.e. we reject the null hypothesis if $t \leq -1.64$

4. Computation:

We have $n_1 = 113, \bar{X}_1 = 11.50, \sigma_1 = 3.56, \sigma_1^2 = 12.67$

$n_2 = 44, \bar{X}_2 = 16.80, \sigma_2 = 2.69, \sigma_2^2 = 7.23$ where 1 denotes boys

and 2 denotes the girls students.

Compute,

$$t = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{(\sigma_1)^2}{n_1} + \frac{(\sigma_2)^2}{n_2}}}$$

$$t = \frac{11.50 - 16.80}{\sqrt{\frac{12.67}{113} + \frac{7.23}{44}}}$$

$$t = -\frac{5.3}{0.525}$$

$$t = -10.095$$

5. Decision: Since $-10.09 < -1.64$. Rejected H_0 . Hence we conclude that there was significance difference between achievement of boys students of public school and girls students of private schools in mathematics at 0.05 levels of significance.

APPENDIX F

Compare the Achievement Score of total Boys and total Girls Students in Mathematics.

1. The null hypothesis and alternative hypothesis are:

$H_0: \mu_1 = \mu_2$ there was no significance difference between achievement of boys and girls students in mathematic.

$H_1: \mu_1 \neq \mu_2$ there was significance difference between achievement of boys and girls students in mathematic.

2. Level of significance: $\alpha = 0.05$ **3. Critical region:** Since the samples were compared group, we used t statistic.

Where $t_{\alpha, n_1 + n_2 - 2} = t_{0.05, 348} = 1.64$

I.e. we reject the null hypothesis if $t \leq -1.64$

4. Computation:

We have $n_1 = 181, \bar{X}_1 = 13.60, \sigma_1 = 4.08, \sigma_1^2 = 16.646$

$n_2 = 169, \bar{X}_2 = 13.80, \sigma_2 = 24.44, \sigma_2^2 = 19.75$ where 1 denotes

boys and 2 denotes the girls students.

Compute,

$$t = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_1)}{\sqrt{\frac{(\sigma_1)^2}{n_1} + \frac{(\sigma_2)^2}{n_2}}}$$

$$t = \frac{13.60 - 13.80}{\sqrt{\frac{16.646}{181} + \frac{19.75}{169}}}$$

$$t = -\frac{0.2}{0.456} = -0.438$$

$$t = -0.44$$

5. Decision: Since $-0.44 > -1.64$. Accepted H_0 . Hence we conclude that there was no significance difference between achievement of boys and girls students in mathematics at 0.05 levels of significance.

Appendix G

Split Half Reliability of the Test

Roll No. of student's	Odd No. of Question(X)	Even No. of Question(Y)	XY	X^2	y^2
1	10	10	100	100	100
2	10	9	90	100	81
3	10	9	90	100	81
4	10	10	100	100	100
5	10	10	100	100	100
6	10	9	90	100	81
7	9	10	90	81	100
8	10	9	90	100	81
9	10	9	90	100	81
10	9	10	90	81	100
11	8	9	72	64	81
12	10	10	100	100	100
13	3	3	9	9	9
14	2	5	10	4	25
15	6	7	42	36	49
16	6	6	36	36	36
17	8	8	64	64	64
18	9	9	81	81	81
19	7	7	49	49	49
20	8	7	56	64	49

Total(N) = 20	$\sum x = 165$	$\sum y = 166$	$\sum xy$ = 1449	$\sum X^2$ = 1469	$\sum y^2$ = 1448
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Reliability of split half of the test $r_{XY} = \frac{N \sum XY - \sum X \sum Y}{\sqrt{\{N \sum X^2 - (\sum X)^2\} \{N \sum Y^2 - (\sum Y)^2\}}}$

Or, $r = \frac{20(1449) - 165(166)}{\sqrt{\{20(1469) - (165)(165)\} \{20(1448) - (166)(166)\}}}$

Or, $r = \frac{28980 - 27390}{\sqrt{\{29380 - 27225\} \{28960 - 27556\}}}$

Or, $r = \frac{1590}{\sqrt{751}}$

Or, $r = 0.914$

Therefore, reliability of half test is 0.914

So, reliability of whole test $R = \frac{2r_1}{1+r_1}$

Or, $R = \frac{2 \times 0.914}{1+0.914}$

Or, $R = \frac{1.828}{1.914}$

Or, $R = 0.955$

Or, $R = 0.96$

APPENDIX H

Number Received by Boys Students of Public Schools in Mathematic.

Number received by boys (x)	Frequency (f)	f x	(x - \bar{x}) ²	f(X - \bar{X}) ²
4	1	4	56.25	56.25
7	16	112	20.25	324
8	11	88	12.25	134.75
9	8	72	6.25	50
10	16	160	2.25	36
11	8	88	0.25	2
12	13	156	0.25	3,25
13	7	91	2.25	15,75
14	7	98	6.25	43.75
15	6	90	12.25	73.5
16	8	128	20.25	162
17	4	68	30.25	121
18	3	54	42.25	126.75
19	5	95	56.25	281.25
Total	N = 113	$\sum fx = 1300$		$\sum f(X - \bar{X})^2$ = 1430.25

Mean Scores of Boys (\bar{X}_1) = $\frac{\sum fx}{N} = \frac{1300}{113} = 11.50$

S.D. of Boys in Public School (σ_1) = $\sqrt{\frac{\sum f(X - \bar{X})^2}{N}} = \sqrt{\frac{1430.25}{113}} = 3.56$

APPENDIX I

Number Received by Girls Students of Public Schools in Mathematic.

N. Received by girls(x)	Frequency (f)	f x	$(x - \bar{x})^2$	$f(X - \bar{X})^2$
5	1	5	59.90	59.90
7	4	28	32.95	131.8
8	11	88	22.47	247.17
9	12	108	12.25	147
10	13	130	7.56	98.28
11	7	77	3.03	21.21
12	13	156	0.55	7.15
13	15	195	0.06	0.9
14	8	112	1.59	12.72
15	8	120	5.12	40.96
16	14	224	10.63	148.82
17	4	68	18.15	72.6
18	6	108	27.67	166.02
19	6	114	39.18	235.08
20	3	60	52.70	158.1
Total	N = 125	$\sum fx = 1593$		$\sum f(X - \bar{X})^2 = 1547.71$

Mean Scores of Girls (\bar{X}_2) = $\frac{\sum fx}{N} = \frac{1593}{125} = 12.74$

S.D. of Girls in Public School (σ_2) = $\sqrt{\frac{\sum f(X - \bar{X})^2}{N}} = \sqrt{\frac{1547.71}{125}} = 3.518 = 3.52$

APPENDIX J

Number Received by Boys Students of Private Schools in Mathematic.

Number received by boys (x)	Frequency (f)	f x	(x - \bar{x}) ²	f(X - \bar{X}) ²
6	1	6	125.44	125.44
12	2	24	25.20	50.40
13	1	13	16.16	16.16
14	1	14	9.12	9.12
15	4	60	4.08	16.32
16	9	144	1.04	9.36
17	20	340	0.02	0.4
18	18	324	0.98	17.64
19	8	152	3.92	31.36
20	4	80	7.84	31.36
Total	N = 68	$\sum fx = 1157$		$\sum f(X - \bar{X})^2 = 307.56$

Mean Scores of boys (\bar{X}_1) = $\frac{\sum fx}{N} = \frac{1157}{68} = 17.02$

S.D. of Boys in Private Schools (σ_1) = $\sqrt{\frac{\sum f(x - \bar{x})^2}{N}} = \sqrt{\frac{307.56}{68}}$

$\sigma_1 = \sqrt{4.5229}$

$\sigma_1 = 2.126$

APPENDIX K

Number Received by Girls Students of Private Schools in Mathematic.

Number received by girls (x)	Frequency (f)	f x	(x - \bar{x}) ²	f(X - \bar{X}) ²
8	1	8	77.40	77.40
10	1	10	46.24	46.24
11	2	22	33.64	67.28
12	1	12	23.04	23.04
14	1	14	7.84	7.84
15	3	45	3.24	9.72
16	3	48	0.64	1.92
17	10	170	0.04	0.4
18	11	198	1.44	15.84
19	8	152	4.84	38.72
20	3	60	10.24	30.72
Total	N = 44	$\sum fx = 739$		$\sum f(X - \bar{X})^2 =$ 319.12

Mean Scores of Girls (\bar{X}_2) = $\frac{\sum fx}{N} = \frac{739}{44} = 16.80$

S.D. of Girls in Private School (σ_2) = $\sqrt{\frac{\sum f(X - \bar{X})^2}{N}} = \sqrt{\frac{319.12}{44}}$

$\sigma = \sqrt{7.2527}$

$\sigma = 2.69$

APPENDIX L

Number Received by Total Boys Students in Mathematic.

N. Received by Boys(x)	Frequency (f)	f x	$(x - \bar{x})^2$	$f(X - \bar{X})^2$
4	1	4	92.16	92.16
6	1	6	57.76	57.76
7	16	112	43.56	696.96
8	11	88	31.36	344.96
9	8	72	21.16	169.28
10	16	160	12.96	207.36
11	8	88	6.76	54.08
12	15	180	2.56	38.4
13	8	104	0.36	2.88
14	8	112	0.16	1.28
15	10	150	1.96	19.6
16	17	272	5.76	97.92
17	24	408	11.56	277.44
18	21	378	19.36	406.56
19	13	247	29.16	379.08
20	4	80	40.96	163.84
Total	N = 181	$\sum fx = 2461$		$\sum f(X - \bar{X})^2 = 3009.56$

Mean Scores of boys (\bar{X}_1) = $\frac{\sum fx}{N} = \frac{2461}{181} = 13.60$

$$\text{S.D. of Boys in Total Schools } (\sigma_1) = \sqrt{\frac{\sum f(x - \bar{X})^2}{N}} = \sqrt{\frac{3009.56}{181}} = 4.08$$

APPENDIX M

Number Received by Total Girls Students in Mathematic.

N. Received by Girls(x)	Frequency (f)	f x	(x - \bar{x}) ²	f(X - \bar{X}) ²
5	1	5	77.44	387.2
7	4	28	46.24	323.68
8	12	96	33.64	269.12
9	12	108	23.04	207.36
10	14	140	14.44	144.4
11	9	99	7.84	86.24
12	14	168	3.24	38.88
13	15	195	0.64	8.32
14	9	126	0.04	0.56
15	11	165	1.44	21.6
16	17	272	4.84	77.44
17	14	238	10.24	174.08
18	17	306	17.64	317.52
19	14	266	27.04	513.76
20	6	120	38.44	768.8
Total	N = 169	$\sum fx = 2332$		$\sum f(X - \bar{X})^2 = 3338.96$

$$\text{Mean Scores of Girls } (\bar{X}_2) = \frac{\sum fx}{N} = \frac{2332}{169} = 13.80$$

$$\text{S.D. of Girls in Total Schools } (\sigma_2) = \sqrt{\frac{\sum f(X-\bar{X})^2}{N}} = \sqrt{\frac{3338.96}{169}} = 4.44$$

APPENDIX N

Statistical Formula Used for Data Analysis.

$$\text{Mean Achievement } (\bar{X}) = \frac{\sum fx}{N}$$

$$\text{Standard Deviation } (\sigma) = \sqrt{\frac{\sum f(X-\bar{X})^2}{N}}$$

$$\text{T - Score, } t = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{(\sigma_1)^2}{n_1} + \frac{(\sigma_2)^2}{n_2}}}$$

$$\text{Degree of Freedom (d. f.)} = n_1 + n_2 - 2$$

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

$$\text{Reliability of whole test } R = \frac{2r_1}{1+r_1}$$

Where, N = total number of students taken from the achievement test

X = Marks obtained by students in odd questions

Y = Marks obtained by students in even questions

\bar{X}_1 = Mean achievement of boys

\bar{X}_2 = Mean achievement of girls

σ_1 = Standard Deviation of boys

σ_2 = Standard Deviation of girls

σ_1^2 = variance of boys

σ_2^2 = Variance of girls

APPENDIX O

Interview Guideline

The researcher asked the question for the purpose of find the causes of low/high achievement in mathematics at grade X in Kailali district which is instructed interview based on the following topics.

- Home Environment of the students
- Economic condition of family
- Attitudes towards mathematics
- Role of parents
- Teaching learning process
- About the causes of low/high achievement in mathematics
- Co-curriculum activities
- Relation between teachers and students

APPENDIX P

Class room observation areas

- Methods
- Materials
- Teaching style of teacher
- Focus the students and teacher knowledge
- Examples and non examples
- Teacher provides feedback to students
- Peer group discussing
- School environment
- Class room communication
- Related lesson to objectives
- Co-curricular activities

Appendix Q
Achievement Test

Subject: Mathematics

Class: 10

Name of School:

Sex:

Name of student:

Roll No:

Class:

Time:

Full marks: 20

Pass marks:

Tick (✓) the best answer from the following questions.

- 1) What is the formula of $n(A \cup B)$?
 - a) $n(A) + n(B) - n(A \cap B)$
 - b) $n(A) - n(B) + n(A \cap B)$
 - c) $n(A) - n(B) + n(A \cup B)$
 - d) $n(A) + n(B) + n(A \cap B)$

- 2) Which is the correct formula of loss percent (L%) ?
 - a) $\text{Loss}\% = \frac{L}{C.P.} \times 100$
 - b) $\text{Loss}\% = \frac{P}{C.P.} \times 100$
 - c) $\text{Loss}\% = \frac{C.P.}{S.P.} \times 100$
 - d) $\text{Loss}\% = \frac{S.P.}{C.P.} \times 100$

- 3) If the area of the square garden is $144m^2$ then what is length of garden?
 - a) 12
 - b) 23
 - c) 26
 - d) 27

- 4) Out of 80 students in a classroom 50% were boys. How many boys were there?
 - a) 20
 - b) 30
 - c) 40
 - d) 50

- 5) Which of the following is true for compound Interest?
 - a) $P [(1+R/100)^T - 1]$
 - b) $P (1 - R/100)^T$
 - c) $P (1+R/100)^R$
 - d) $P (1 - R/100)^{2T}$

- 6) A mobile is bought for Rs 400 and sold for Rs 800. What will be profit percent?
 - a) 25%
 - b) 50%
 - c) 75%
 - d) 100%

- 7) What is the formula of area of Parallelogram?
 - a) $A = b \times h$
 - b) $A = \frac{1}{2} b \times p$
 - c) $A = \frac{1}{2} b \times h$
 - d) $A = l \times b \times h$

- 8) What is the formula of volume Cylinder?
 - a) $\frac{4}{3} \pi r^3$
 - b) $\pi r^2 h$
 - c) $l \times b \times h$
 - d) $\frac{2}{3} \pi r^3$

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