

CHAPTER - I

INTRODUCTION

1.1 Background of the study

The world is moving towards the advancement of science and technology. For the better fitness in such word "Education" is a most essential factor like heart of human body. So it is better to say 'Education' and 'Human life' have relation like a relation between nail and muscle in human body. The importance of education can not be explained in words.

According to Oxford Dictionary- "Education is a process of teaching, training and learning especially in schools or colleges to improve knowledge and develop skills."

According to the definition formulated by a group of experts for the Dictionary of Education, education is " (a) the aggregate of all the processes by which a person develops ability attitudes and other forms of behaviour of practical value in the society in which he lives; (b) the social process by which people are subjected to the influence of a selected and controlled environment, so that they may obtain competence and optimum individual development."

The above mentioned definition implies that education is a product of the result of interacting forces including individual insight, intellect, interest and experiences. These are utilized through educational procedures towards the modification of individual purpose, knowledge, behaviour, habit, attitudes and ethical understanding.

The term "mathematics" has been derived from an ancient Greek word "mathematicia" means "inclined to learn". Benjamin pierce, one of the best of the American trained mathematician said that "Mathematics is the science which draws necessary conclusions".

Mathematics has played a very important role in building up modern civilization by perfecting all sciences. Even though, people have only vague idea that all progress made by man in the result of scientific progress, they are strongly in favour of scientific and industrial education. This emphasis is confined to sciences such as physics, chemistry, biology, medicine and engineering. Mathematics, which is a science by any criterion and which rightfully belongs to this group, has not been accepted and emphasized as a science. It is an efficient and necessary tool which is employed by all these sciences and without which these sciences would not have made much progress. It has been very properly said about mathematics, "It is a science of all sciences and art of all arts". It is the pivot of all the sciences and arts (Sidhu, K.B., P. 27).

Thus, mathematics like a language is a basic tool of communication. It is essential for every day life as well as for higher study in the field of science and technology. In general, mathematics learning helps the people to understand and interpret very important quantitative aspects of living and natural phenomena. Realizing the fact of prime necessity of mathematics for human beings, its teaching for formal education is prevalent throughout the world.

Focusing on the importance of mathematics a report of UNESCO describes. "Mathematics is one of the principle disciplines to have determined the evolution and accelerated development of the technology.

For this reason science places primary emphasis of the development of mathematical theory and an improving its effectiveness when applied to practical ends. Dealing with this problems requires that due emphasis in mathematics studies be placed on the exposition of mathematical ideas, concepts and methods with their application to real life situation" (UNESCO 1986, P.27).

Regarding the objective of the study of mathematics Butler and Wren states: "The objective of the study of mathematics is to fold the acquisition of useful knowledge and the cultivation and discipline of the mental power. (Butler and wren, 1965, P.6).

What should be the function of mathematics in school? About this question Wood states: "The function of mathematics is to help pupil at each level, make better adjustments to social surroundings and relationship in their own everyday lives (wood, 1960:P.375). Secondary level education is the most important stage in the education of a student and the progressive development of the personality. The main objective of secondary level mathematics is to develop basic concepts and skills for different educational areas and prepare the foundation for further studies.

Mathematics has been given a significant place at all levels of school education in Nepal with the introduction of National Education System Plan. Out of the total time instruction in schools, 30 percent time is allocated to the mathematics at primary level, 20 percent at the lower secondary level and 12 percent at the secondary level.

NESP justifies the teaching mathematics at school levels in the following lines:

“Students apply mathematical concepts skills and logical reasoning to solve many different kinds of problems not only as a student but also an adult. The teaching of mathematics helps to promote in students a disciplined and creative mind, the habit to working diligently and patiently, and the habit of using logical reasoning in solving not only mathematics problems but many other new and different problems as well”.(I.O.E.,2035)

Like in NESP curriculum, regarding the purpose of teaching mathematics, Krulik and Weize states: “The primary purpose of the teaching of mathematics should develop those powers of understanding the analyzing relation of quantity and space which are necessary to an insight into control over our environment and to an appreciation of progress of civilization in its various aspects, and to develop those habits of thought and of action which will make those powers effective in the life of the individual”. (Butler and Wren, 1965).

In the history of education of Nepal, several attempts can be observed in the improvement of mathematics education. Several education commissions had been constituted to design education for the contemporary Nepal. The Nepal National Education Planning Commission (NNEPC) was established in 1914 to create an education system. The plan proposed by the NNEPC was to “device a uniform pattern of education for the country.” It had included mathematics education as an important subject. The All Round National Education Committee (ARNEC) developed a second education plan in 1961. The conclusion of the plan was “There is lack of education opportunities for all section of the peopleand the prevailing education system was

completely unrelated to the objectives of the national development plan (Sharma, 1982). The National Education System Plan (NESP 1971-76) as well as other education commissions has realized that a well-grounded understanding in mathematics is essential in every life as well as for higher studies in the field of science and technology. So the NESP stated about the need and important of mathematics in school curriculum as:

“A well ground understanding of mathematics is essential for everyday life as well as for higher studies in the field of science and technology. Mathematics like language is a basic of communications involve the frequent use of mathematical concept”.

Significant changes in the field of education have taken place in Nepal with introduction of multiparty democracy in 1990 A.D. The National Education Commission 1992 recommended that the school curriculum should be revised in the context of recent political change and needs of the society to meet the demands of the modern time. Several other programmes such as teacher training, training of the school Head-teacher and formative researches for the improvement of the education system have been conducted. Concerning to the mathematics education curriculum, the new curriculum's effectiveness was questioned when more than 50% students failed in the School Leaving Certificate examination. Considering this view, several researches have been done to find out of weakness behind the poor achievement in mathematics in school education. Since NESP (1971) compulsory mathematics is considered as an essential component of secondary school education. With the reinstatement of democracy in Nepal in 1990 A.D.; Curriculum Development Center (CDC) has brought some improvements in school

curriculum and textbooks. Accordingly, the improved textbooks of different grades are being implemented from 1992 A.D. While observing the result of School Level Certificate (SLC) examinations failure percent in mathematics is high in comparison to other subjects. In such situation, it is common that students, parents, teachers along with others are worrying about it. Only the reason may not be responsible behind the high rate of failure in mathematics. Curriculum, textbooks, teachers training and preparation, teaching materials, teaching method, language, socio-cultural and economical status may be other responsible factors behind high failure rate in mathematics. Several studies have shown that the achievement in mathematics is affected by different variables such as languages, ethnicity, gender and socio-economic condition of the students' families (K.C. 2001).

Almost all research findings have shown that we cannot identify a unique determinant of pupil's achievement but it is widely accepted that there may be many factors that are related to mathematics achievement. Some factors of variables such as students gender, age, parents education, location of school, prior knowledge, motivation, home, environment, teacher's academic qualification, teachers' teaching experiences, availability of learning materials, medium of instruction, class size, socio-economic level of community, absence or irregularity of teachers in school, low class attendance of students etc. that effect mathematics achievement are manipulative in Nepal. (Joshi, 1997).

Many researchers have studied about the comparative study of achievement in mathematics of school levels but very few studies have been done regarding the impact of geographical topography or location in

achievement in mathematics. So, the researcher intends to study the achievement in mathematics of secondary level students of Baglung and Kaski districts of Dhaulagiri and Gandaki zone respectively. These districts are selected to make the comparative study of mathematics achievement of urban and rural areas.

The researcher aims this study to compare students' achievement in mathematics in secondary schools at Baglung and Kaski districts to find out if there is any significance difference among these districts students achievement in mathematics.

1.2 Statements of the problems

There are same academic years, same curriculum, same total teaching periods, same text books and same evaluation system whether the students' achievement in mathematics of Baglung and Kaski is equal or not? The problems of this study mainly concern to compare the achievement of grade IX students in mathematics studying in Baglung and Kaski districts. Thus the study intends to answer the following questions:

1. Does the mathematics achievement of secondary level students of Baglung district significantly different from that of students of Kaski district?
2. Does the mathematics achievement of male students of Baglung district significantly differ from that of students of Kaski district?
3. Does the mathematics achievement of female students of Baglung district significantly differ from that of students of Kaski district?

4. Does the mathematics achievement of rural and urban students of Baglung district significantly differ from that of students of Kaski district?

1.3. Significance of the study

Mathematics is a compulsory subject at secondary level having same curriculum, similar evaluation system and same textbooks but students' achievement in different schools background may be different. This study has the following implications:

-) This study informs mathematics teachers about the achievement level of their students taken place in mathematics and guides them in a way how they have to make their teaching strategies effective by using proper corresponding teaching methods.
-) It helps concerned sector to consider the geographical diversity and while working on the secondary school educational programme.
-) The researcher also expects that the outcomes of the study will be useful, mostly for the people working in the field of education viz. teachers, curriculum developers, students, experts, policy markers etc. as well as the people related with the field of education as parents, social workers etc.

1.4. Objectives of the study

The objectives of this study were as follows:

- i. To compare the mathematics achievements of the secondary level students of Baglung and Kaski districts.
- ii. To compare the mathematics achievement of the secondary level male students of Baglung and Kaski districts.
- iii. To compare the mathematics achievement of the secondary level female students of Baglung and Kaski districts.
- iv. To compare the mathematics achievement of the secondary level rural students of Baglung and Kaski districts.
- v. To compare the mathematics achievement of the secondary level urban students of Baglung and Kaski districts.

1.5. Statement of Research Hypothesis

1.5.1 Research hypothesis

- i. There is no significant difference between mathematics achievement of the students of Baglung and Kaski districts.
- ii. There is no significant difference between mathematics achievement of the male students of Baglung and Kaski districts.
- iii. There is no significant difference between mathematics achievement of the female students of Baglung and Kaski districts.
- iv. There is no significant difference between mathematics achievements of the rural students of Baglung and Kaski districts.

- v. There is no significant difference between mathematics achievements of the urban students of Baglung and Kaski districts.

1.5.2 Statistical Hypothesis.

1. $\mu_0 : \mu_1 = \mu_2$ (Null Hypothesis)

$$\mu_1 : \mu_1 \neq \mu_2 \text{ (Alternative Hypothesis)}$$

Where μ_1 and μ_2 are the corresponding parametric means of the achievements among the students of Baglung and Kaski districts.

2. $\mu_0 : \mu_3 = \mu_4$ (Null Hypothesis).

$$\mu_1 : \mu_3 \neq \mu_4 \text{ (Alternative Hypothesis)}$$

Where μ_3 and μ_4 are the corresponding parametric means of the achievements of male students of Baglung and Kaski districts.

3. $\mu_0 : \mu_5 = \mu_6$ (Null Hypothesis)

$$\mu_1 : \mu_5 \neq \mu_6 \text{ (Alternative Hypothesis)}$$

Where μ_5 and μ_6 are the corresponding parametric means of the achievement of female students of Baglung and Kaski districts.

4. $\mu_0 : \mu_7 = \mu_8$ (Null Hypothesis)

$$\mu_1 : \mu_7 \neq \mu_8 \text{ (Alternative Hypothesis)}$$

Where μ_7 and μ_8 are the corresponding parametric means of the achievement of rural students of Baglung and Kaski districts.

5. $\mu_0 : \mu_9 = \mu_{10}$ (Null Hypothesis)

$$\mu_1 : \mu_9 \neq \mu_{10} \text{ (Alternative Hypothesis)}$$

Where μ_9 and μ_{10} are the corresponding parametric means of the achievement of urban students of Baglung and Kaski districts.

1.6 Limitations of the study

The study has the following limitations.

- a. The study was limited to Baglung and Kaski districts.
- b. It was limited to public secondary schools.
- c. Students studying at tenth grade were considered as sample population for the study.
- d. It was conducted in the subject of mathematics.
- e. Equal number of boys and girls were randomly selected.
- f. Achievement test was done only in compulsory mathematics.
- g. It is only related to mathematics achievement not other factors.

1.7. Definition of the terms

Achievement:

In this study, achievement is defined in terms of scores obtained by the students in an achievement test constructed by the researcher.

Public schools:

In this study, those schools which are established and sponsored by Government of Nepal.

Urban and Rural Areas:

In this study, the area of Baglung and Kaski districts which is facilitated with minimum requirements such as road electricity, telephone, drinking water supply, management of market etc is urban area and remaining areas are rural.

Gender:

The condition of being male or female, here it refers to the male students and female students.

CHAPTER - II

REVIEW OF RELATED LITERATURE

There are so many research studies about the mathematics achievement of students. This chapter deals with the review of some of the related studies to highlight the position of the present study. Comparative study of achievement in mathematics under different variables was conducted. Some of these are teachers, gender, teaching method with and without using teaching materials, different class size, parent's income, parents' education, parents' occupation, urban and rural, ethnic groups, castes etc. Likewise the researcher has decided to study the topic "A comparative study of mathematics achievement at secondary level in Baglung and Kaski districts". So, some of the studies which are related to this study have become reviewed.

The first international mathematics study (FIMS, 1964) and second international mathematics study (SIMS, 1981-82) with sample size 8091 of Japan and 6858 of US of 8th grade students studied with 36 test items showed that the mathematical achievement of Japanese students was higher than that of American students.

The FIMS and SIMS continued their study with sample size 7954 of Japan and 4671 of USA of 12th grade students administering the tool consisting of 18 test items. It was concluded that mathematics achievement of Japanese students was higher than that of American students.

Education Development Service Centre (1997) studied on the National Achievement Level of grade three students. After studying, EDSC found that: (a) achievement scores of private schools students were more than public schools students; and (b) students' achievement was influenced by difference factors such as students, teachers, parents and schools and out of them educated parents influenced positively in the better achievement of their children.

Hanna (1986) conducted a study in sex differences in mathematics achievement of Canadian students of grade eight using the data from the Second International Mathematics Study in the five area arithmetic, algebra, probability, Statistics, geometry and measurement and showed that no significant different in performance of boys and girls on the arithmetic's, algebra and probability. For the geometry and measurement, the boys' performance was found higher than that of girls.

Bajracharya (1975) developed an objective measuring instrument consisting of 75 multiple choice items covering from arithmetic, algebra and geometry according to the new mathematics curriculum for eight grade students. The field study was conducted to the beginning to 9th grade students and sample of Kaski district. The sample of his study covered 30% of the total students' population. The finding of his study related that the student's performance was better in arithmetic and algebra than in geometry and the achievement of boys was better than of girls in all areas.

In another study entitled “A comparative study of boys and girls attitude towards mathematics,” Tiwari (1984) found that the attitude of boys was more positive than the attitude of girls towards mathematics.

Mahato (1985) conducted a study on topic "A comparative study of Achievement in Mathematics at Grade Eight" in eight secondary schools out of 31 schools in Lalitpur district showed that urban students achievement was higher than rural students achievement.

Shrestha (1991) conducted comparative study on topic "Sex difference in achievement in mathematics of nine grade students in Gorkha district" consisting 200 students. (100 boys and 100 girls) as a sample and showed that boys' achievement was higher than girls in achievement test.

Rao and Latha (1995) studies the achievement of mathematics of intermediate students from residential and non-residential colleges of Guntur district of Andhra Pradesh and they conducted that the mathematics achievement of students studying in residential colleges was higher than that of the students studying in non-residential colleges. They also found that the achievement of boys was higher than that of girls.

An international research report (2000) about achievement differences between types of school and groups of school concluded that pupils in urban areas perform an average better than their counterparts in rural areas. The reasons generally given include the fact that big cities and to a lesser extent, mid-sized urban areas have relatively large

proportions of high socio-economic status families. Schools in such areas often have better facilities and are in a favorable position to attract good teachers.

Chaudhary (2000), in his master thesis, "A comparative study of achievement in mathematics of primary level students related to parents education status" concluded that mathematics achievement of educated parents' children were found higher than illiterate parents' children. At last, he concluded that parents' educational status played vital role for the achievement of students in mathematics.

Sharma K.D. (2000), in his research "A comparative study of the achievement of students of grade IX in topic of vectors of secondary school mathematics curriculum" concluded that the mean achievement higher than the achievement of the students of public schools and urban school's scores was highly significant than the rural school's scores.

Adhikari, S.D (2001), in his research on "A comparative study of achievement in mathematics of primary level students to parents income" concluded that the achievement of the students of high income group is higher than the achievement of students of middle income and low income group.

Shah (2000) conducted a study entitled "A comparative study of achievement in mathematics of lower secondary level student's of different ethnic groups" including 150 Brahmin, Sah and Chaudhary students of grade eight of the public schools in Saptary district concluded

that the achievement of Brahmin students were higher than that of Sah and Chaudhary students.

Neupane, B. (2001), in his research on "A comparative study of the achievement of students of grade IX on the topic function of secondary level in Kathmandu district" concluded that the mean achievement of the students of private schools was significant than the mean achievement of the students of public schools and the achievement of boys was greater than that girls.

Pokhrel, M. (2001) did his research entitled "Mathematics achievement in SLC examination between public and private school students in Kaski district" and found that the students of private school have greater achievement in mathematics than public school. The correlation between compulsory and optional mathematics score in public and private school students was sustainability positive.

K.C. (2002) conducted a study entitled "A comparative study on mathematics achievement of orphan and Non-orphan students of primary level" in sample of 170 students (85 orphans and 85 non-orphans) of grade five from 6 sample schools in Bhaktapur, Kaski, Kathmandu, surkhet, Sunsari and Kavre districts showed that:

- a. Non-orphan students achievement score was higher than orphan students achievement score and there is significant difference between their mean scores,
- b. Boys achievement score was higher than girls achievement score and there is insignificant difference between their mean scores.

- c. Non-orphan boys' achievement score was higher than that of orphan boys' achievement score and there is significant difference between their mean score and there is significant difference between their mean scores.
- d Non-orphan girls achievement score was higher than that of orphan girls achievement score and there is significant difference between their mean score
- e The mean score of primary school students in Kathmandu district was higher than other districts.

Timilsina, N.P. (2004) in his research on " Mathematics achievement of secondary level students taught by the teachers with and without teacher education background" concluded that the mean scores of the students taught by teacher education background was higher than the mean scores of the students taught by the teacher without education background.

Neupane, B.K. (2005) in his research on "A comparative study on private and public secondary school students achievement in algebra of Kathmandu district" Concluded that the mean achievement scores of students of private school was higher than the students of public schools in Kathmandu district.

Thapa (2005) conducted a study on topic "A comparative study of secondary Level students' Achievement in Mathematics between private and public school at Butwal Municipality of Rupandehi District" and

found that the mean score of private school students is higher than the public school students.

Paudel, B. (2006), in his research on "A comparative study on mathematics achievement of secondary level students taught by trained and untrained teachers" concluded that the mean scores of the students taught by trained teachers were higher than the mean scores of the students taught by untrained teachers.

Sharma, K.P. (2006), in his research on "A comparative study of achievement in mathematics of grade five children from rural and suburban area of Parbat district" concluded that the mean achievement of students of suburban area was higher than the rural area of Parbat district.

Nayak, B. (2007), in his research on "A comparative study of students' achievement in mathematics from business and non-business occupational parents" concluded that the mean achievement of students of non-business occupational parents was higher than the business occupational parents.

Dhakal, T.P. (2009), in his research on "A comparative study of mathematics achievement at Send up examination and SLC examination" concluded that the mean achievement score of the SLC examination was higher than the Send up examination.

Likewise, the researcher has decided to study the topic "A comparative study of mathematics achievement at secondary level in Baglung and Kaski districts" The review of related literature will guide researcher in this research.

CHAPTER - III

RESEARCH METHODOLOGY

Research methodology is a sequential procedure and methods to be adopted in systematic study¹. In this chapter methodology of this research has been divided as follows.

- A. Sampling procedure
- B. Instrument/Tools
- C. Data collection procedure
- D. Data analysis procedure

3.1 Sampling Procedure

3.1.1. Population

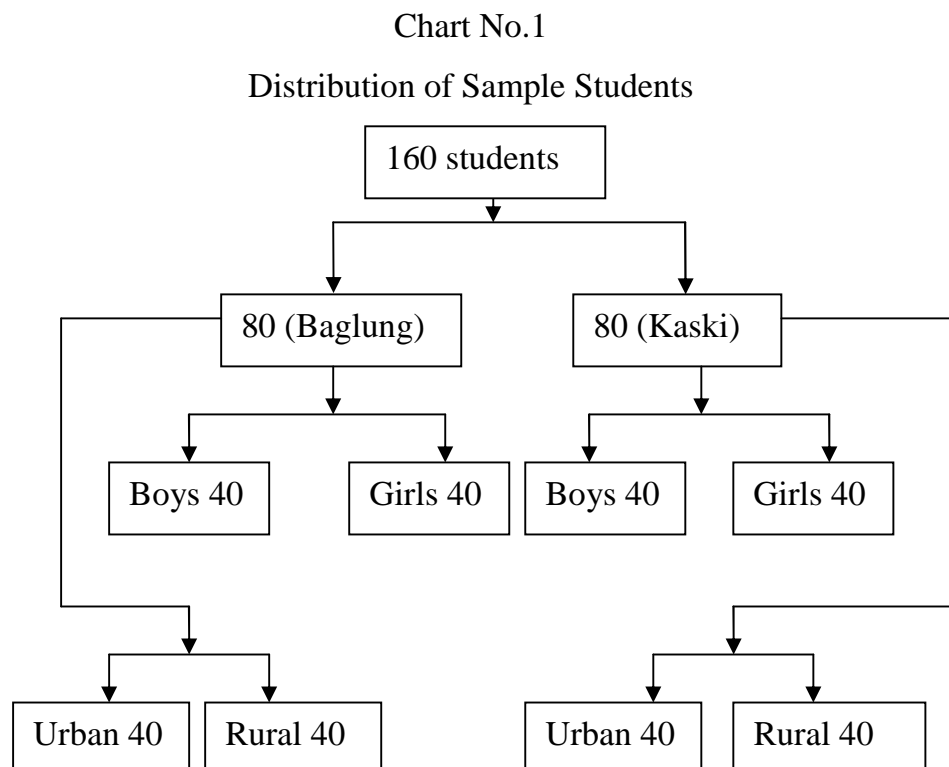
The target population for the achievement test was grade IX students of all public schools of Baglung and Kaski districts. But due to the time factor, researcher had to go to the beginners of grade X. The sample students had completed the grade IX mathematics course during the academic year 2065 B.S.

3.1.2. Sample Selection

There were 67 secondary public schools and 22 public higher secondary schools in Kaski district and 87 public secondary schools and 23 public higher secondary schools in Baglung district. From Kaski and Baglung districts 8 schools each (4 rural and 4 urban) were purposively selected. While taking sample, these districts were divided into two areas

¹ C.R. Kothari, Quantitative Technique, (New Delhi, Vikash Publishing House Pvt. Ltd. 1992), 17

i.e. urban and rural. So there were 16 sample schools for the present study. The researcher selected 10/10 students including equal number of boys and girls from each sample school of Baglung and Kaski districts respectively by applying random sampling technique. Thus, while sampling every achievement test paper tested in the students was given code number. The same code numbers were written in the piece of paper also which were equal to test paper and these pieces of paper were put in a basket and taken out randomly. The same coded pieces of answer paper were selected as sampling for the same number of achievement test paper. So there were total 160 students as sample for the study and its distribution pattern is shown in the following chart.



3.2. Instrument / Tools

An achievement test was the main instruments for the study.

3.2.1 Construction of Test

The researcher himself has constructed an achievement test consisting of 50 multiple choice items covering the contents of grade IX mathematics. The learning outcomes were targeted to the parameters of cognitive domain i.e. Knowledge, comprehension, skill and application. The achievement test items were taken from different areas of mathematics i.e. sets, arithmetic, mensuration, algebra, geometry, trigonometry, statistics and probability. There were 2(4%) items from sets, 10(20%) items from arithmetic, 10(20%) items from algebra, 8(16%) items from mensuration, 10(20%) items from geometry, 5(10%) items from trigonometry, 3(6%) items from statistics and 2(4%) items from probability.

For the standardization of the test, pilot testing was conducted and each item of the test was subjected to item analysis before the final test paper was finalized.

Table 1
Items Distribution

S.N.	Units	Cognitive Level				Total	Percent
		Knowledge	Compre- hension	Skill	Application		
1.	Sets	1	1				4
2	Arithmetic	2	3	2	3	10	20
3.	Algebra	2	5	1	2	10	20
4.	Mensuration	2	2	2	2	8	16
5.	Geometry	4	2	3	1	10	20
6.	Trigonometry	2	1	1	1	5	10
7	Statistics	1	-	-	2	3	6
8	Probability	1	1	-	-	2	4
	Total	15	15	9	11	50	100
	Percentage	30	30	18	22		

3.2.2 Item Analysis

For the reliability of the test, the investigator carried out a pilot study of the test prepared to 30 students of Mahendra Ma.Vi., Sukhaura, Baglung. Before administrating the test paper, the investigator had instructed the students about the methods of responding the test paper.

The final selection of the test-items was based on the item analysis of the pre-tested items. The test was refined by eliminating and modifying the inappropriate items. Item analysis table determines the Difficulty index (P-value) and the Discrimination index (D-value) of each item in the instrument. The P-Value and D-value of each item were calculated from the 27% of the highest scores and 27% of the lowest scores. While taking p-value and D-value of each item, as mentioned by Singh (1997)

an test "Measurements and research methods in behavioral sciences", only those items were selected whose p-value is ranging between 30 to 70 percent and D-value 0.20 to 0.80.

The p-value i.e. difficulty level of each item was calculated by the following formula.

$$P = X \frac{U_R - \Gamma L_R}{N} | 100\%$$

Where P=Difficulty Level

U_R = Correct Response of Upper 27% students

L_R = Correct Response of Lower 27% students

N = Total Number of Items

Discriminating level is a number which differentiates the strong and poor students. The D-value of each item were calculated by the following formula

$$D = X \frac{U_R - Z L_R}{U_n - L_n}$$

Where, D= discriminating level

U_R = Correct Response of Upper 27% Students

L_R =Correct Response of lower 27% students

U_n = Total Number of Upper 27% students

L_n = Total Number of Lower 27% students.

Table 2
Item analysis

Sub Items	Upper 27% Student Making Correct Responses						Lower 27% Student Making Correct Responses								Remarks
	A	B	C	D	E	CR	F	G	H	I	J	CR	P%	D	
1	1	1	0	1	1	4	1	0	0	1	1	3	70	0.2	
2	1	0	1	1	0	3	0	0	1	1	1	3	60	0	
3	0	1	0	0	1	2	0	0	1	0	0	1	30	0.2	
4	1	1	1	1	1	5	0	1	0	0	0	1	60	0.8	
5	1	1	1	0	1	4	1	1	1	1	1	5	90	-0.2	Cancelled
6	0	0	1	1	1	3	0	0	0	0	0	0	30	0.6	
7	1	0	0	1	0	2	0	1	0	0	0	1	30	0.2	
8	0	1	1	0	1	3	1	0	0	0	0	1	40	0.4	
9	1	1	0	1	1	4	1	1	0	0	1	3	70	0.2	
10	1	0	0	1	0	2	0	0	0	0	0	0	20	0.4	Cancelled
11	0	1	0	1	1	3	0	0	1	0	0	1	40	0.4	
12	1	1	0	0	0	2	0	1	0	0	0	1	30	0.2	
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Cancelled
14	1	1	1	1	1	5	1	0	0	1	0	2	70	0.6	
15	1	1	0	1	1	3	0	1	0	0	0	1	40	0.4	
16	0	1	0	1	0	2	0	0	0	0	0	0	20	0.4	Modified
17	1	1	1	1	1	5	1	1	0	1	0	3	80	0.4	
18	1	1	0	1	1	4	1	0	1	0	0	2	60	0.4	
19	1	1	1	0	1	4	0	0	0	1	1	2	60	0.4	
20	1	1	1	1	1	5	1	0	1	0	0	2	70	0.6	
21	0	0	1	0	0	1	1	0	0	1	1	3	40	-0.4	Cancelled
22	1	0	1	1	0	3	0	0	1	0	1	2	50	0.2	
23	1	1	1	1	1	5	1	1	1	1	1	5	100	0	Cancelled
24	1	1	1	0	1	4	0	0	0	0	1	1	50	0.6	
25	1	1	1	1	1	5	1	1	0	1	0	3	80	0.4	
26	1	0	0	1	1	3	0	1	0	0	0	1	40	0.4	
27	0	1	0	0	1	2	1	0	1	1	1	4	60	-0.4	Cancelled
28	1	1	1	0	1	4	0	1	0	0	1	2	60	0.4	
29	1	0	0	1	1	3	0	0	0	1	0	1	40	0.4	
30	1	0	0	1	0	2	0	0	0	1	1	2	40	0	
31	1	1	1	1	1	5	1	1	1	1	1	5	100	0	Cancelled

32	1	1	1	1	1	5	0	1	0	1	1	3	80	0.4	
33	1	1	1	0	1	4	0	0	1	0	1	2	60	0.4	
34	1	1	1	0	1	4	1	0	0	1	0	2	60	0.4	
35	1	1	1	1	1	5	1	0	1	0	1	3	80	0.4	
36	1	1	1	1	1	5	1	0	1	1	1	4	90	0.2	
37	1	1	1	1	0	4	1	0	1	0	1	3	70	0.2	
38	1	1	1	0	1	4	0	0	0	1	1	2	60	0.4	
39	1	1	1	0	1	4	1	1	1	0	1	4	80	0	
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Cancelled
41	1	1	0	1	0	3	0	0	1	0	0	1	40	0.4	
42	1	1	1	1	1	5	1	0	1	0	1	3	80	0.4	
43	1	0	1	1	1	4	0	1	0	1	0	2	60	0.4	
44	1	1	1	1	1	5	1	0	0	0	1	2	70	0.6	
45	0	0	0	1	0	1	1	0	1	0	1	3	40	-0.4	Cancelled
46	1	1	1	1	1	5	0	0	0	1	0	1	60	0.8	
47	1	1	1	1	1	5	1	1	1	0	1	4	90	0.2	
48	1	1	0	0	1	3	0	0	1	0	1	2	50	0.2	
49	1	1	1	1	1	5	1	1	0	1	0	3	80	0.4	
50	0	1	0	1	1	3	0	0	1	0	0	1	40	0.4	

The test was refined by modifying and canceling some of the items. Table 2 of item analysis determines the level of difficulty and power discrimination of each item in the instrument. The items those having D-values greater than or equal to 0.2 and P-values lying between 30% to 90% were good items. So ,41 items numbered 1, 2, 3, 4, 5, 6, 8, 9, 11, 12, 14, 15, 16, 17, 18, 19, 20, 22, 24 , 25, 26, 28, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 49 and 50 were accepted. The items with D-value less than 0.2 along with negative values were also rejected. So, the items numbered 7, 10, 13, 21, 23, 29, 31, 45 and 48 were eliminated. The items having P-values from 20% to 30% were considered difficult. Thus, the refined final achievement test contains forty one items (See Appendix A).

3.3 Data Collection Procedure

In this study, first of all researcher visited the district Education offices of Baglung and Kaski to collect the data of public secondary schools located in those districts. Achievement tests were prepared by the researcher himself after pilot study. The test items were based on the national curriculum prescribed by a "Ministry of Education". Thus test items were given to the students and the performance of the students was tested. The test was administered among about 160 students participating equally from both Baglung and Kaski districts. The students were instructed not to copy or discuss.

3.4. Data analysis Procedure

The researcher analyzed the obtained scores by calculating the mean \bar{x} , Standard deviation () of sample students. The t-test with two tailed test was used to test the research hypothesis at 5% level of significance i.e. at 95 percent confidence level.

CHAPTER - IV

ANALYSIS AND INTERPRETATION OF DATA

The data for the study as described in chapter III were collected from secondary level students. The collected data were tabulated and analyzed using mean, standard deviation and two-tailed t-test. The data of the achievement test scores were analyzed under the following heading.

1. Comparison of mathematics achievement of the students of Baglung and Kaski districts.
2. Comparison of mathematics achievement of the male students of Baglung and Kaski districts.
3. Comparison of mathematics achievement of the female students of Baglung and Kaski districts.
4. Comparison of mathematics achievement of the rural students of Baglung and Kaski districts.
5. Comparison of mathematics achievement of the urban students of Baglung and Kaski districts.

4.1 Comparison of Mathematics Achievement of the Students of Baglung and Kaski Districts.

There were total 160 students from Baglung and Kaski districts. The mean, standard deviation and corresponding t-value of the scores obtained by the grade IX (secondary level) student of Baglung and Kaski district are presented with table 3.

Table 3

Comparison of Mathematics Achievement of the students of Baglung and Kaski Districts.

District	No of student	Mean	S.D.	Mean Difference	T-value	Conclusion
Baglung	80	19.587	6.617	2.83	2.62	Null hypothesis was rejected ($2.62 > 1.96$)
Kaski	80	22.425	7.139			

* Significant at 0.05 level.

The table 3 shows that the mean scores of the student of Baglung and Kaski districts are 19.587 and 22.425 respectively. Therefore the mean score of the students of Kaski district is higher than the students of Baglung district by 2.83. Since the calculated value of t ($t=2.62$) is greater than the tabulated value ($t=1.96$). So the null hypothesis was rejected and the alternative hypothesis was accepted. It indicates that the achievements score of the students of Kaski was significantly different than the students of Baglung district.

4.2 Comparison of Mathematics Achievement of the Male Students of Baglung and Kaski Districts

The mean, standard deviation and corresponding t -value of the scores obtained by the secondary level (Grade IX) male student of Baglung and Kaski districts are presented with table 4.

Table 4
Comparison of Mathematics Achievement of the Male Students of
Baglung and Kaski Districts

District	No of student	Mean	S.D.	Mean Difference	T-value	Conclusion
Kaski	40	23.125	7.98	3.425	2.03	Null hypothesis was rejected ($2.03 > 1.98$)
Baglung	40	19.7	7.054			

* Significant at 0.05 level

Table 4 shows that the mean scores of the male students of Baglung and Kaski districts are 19.7 and 23.125 respectively. Therefore the mean score of the male students of Kaski is higher than the male students of Baglung by 3.425. Since the calculated value of t ($t=2.0$) is greater than the tabulated value ($t=1.98$), the null hypothesis was rejected and alternative hypothesis was accepted. It indicates that the achievement score of the male students of Kaski district was significantly different than the male students of Baglung district at 0.05 level.

4.3 Comparison of Mathematics Achievement of the Female Students of Baglung and Kaski Districts

The mean, standard deviation and corresponding t-value of the scores obtained by female students of Baglung and Kaski districts are tabulated below.

Table 5
Comparison of Mathematics Achievement of the Female
Students of Baglung and Kaski Districts

District	No of student	Mean	S.D.	Mean Difference	T-value	Conclusion
Kaski	40	21.725	6.103	2.225	1.65	Null hypothesis was accepted ($1.65 < 1.98$)
Baglung	40	19.47	6.148			

*Significant at 0.05 level.

The table 5 shows that the mean score of female students of Kaski and Baglung districts are 21.725 and 19.47 respectively. Therefore the mean score of the female student of Kaski is higher than the female students of Baglung by 2.225. Since the calculated value of t ($t=1.65$) is less than the tabulated value ($t=1.98$), the null hypothesis was accepted and alternative hypothesis was rejected. It indicates that the achievement score of female students of Kaski and Baglung districts did not differ significantly at 0.05 level.

4.4 Comparison of Mathematics Achievement of the Rural Students of Baglung and Kaski Districts

The mean, standard deviation and corresponding t-value of the scores obtained by the grade IX rural students of Baglung and Kaski districts are presented with table 6.

Table 6
Comparison of Mathematics Achievement of the Rural Students of
Baglung and Kaski Districts

District	No of student	Mean	S.D.	Mean Difference	T-value	Conclusion
Kaski	40	20.175	5.643	2.12	1.55	Null hypothesis was accepted ($1.55 < 1.98$)
Baglung	40	18.05	6.54			

* Significant at 0.05 level

Table 6 shows that the mean scores of rural students of Kaski and Baglung districts are 20.175 and 18.05 respectively. Therefore the mean score of rural students of Kaski district was higher than the rural students of Baglung district by 2.12. Since the calculated value of t ($t=1.55$) is less than the tabulated value ($t=1.98$), the null hypothesis was accepted and the alternative hypothesis was rejected. It indicates that the achievement score of rural students of Kaski and Baglung district did not differ significantly at 0.05 level.

4.5 Comparison of Mathematics Achievement of the Urban Students of Baglung and Kaski Districts

The mean, standard deviation and corresponding t-value of the scores obtained by the secondary level (grade IX) urban students of Baglung and Kaski districts are tabulated below.

Table 7
Comparison of Mathematics Achievement of the Urban students of
Baglung and Kaski Districts

District	No of student	Mean	S.D.	Mean Difference	T-value	Conclusion
Kaski	40	24.675	7.743	3.55	2.26	Null hypothesis was rejected ($2.26 > 1.98$)
Baglung	40	21.125	6.325			

* Significant at 0.05 level.

Table 7 shows that the mean scores of urban students of Kaski and Baglung districts are 24.675 and 21.125 respectively. Therefore the mean score of urban students of Kaski district is higher than the urban student of Baglung district by 3.55. Since the calculated value of t ($t=2.26$) is greater than the tabulated value of t ($t=1.96$), the null hypothesis was rejected and alternative hypothesis was accepted. It indicates that the achievement score of urban students of Kaski district was significantly different than the urban students of Baglung district at 0.05 level.

CHAPTER - V

SUMMARY, FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The present study was concerned with the comparative study of mathematics achievement of secondary level students of Baglung and Kaski district. For this study, researcher constructed the achievement test paper from prescribed curriculum and text book of grade IX. To standardize the test paper, pilot test was conducted at Shree Mahendra Ma.Vi, Sukhaura, Baglung. The researcher prepared the item analysis chart of test paper for checking the items difficulty and discriminating power.

After the item analysis, the final test was conducted in 41 multiple choice questions. The standardized test was administered in the 16 public school of Baglung and Kaski districts. The researcher analyzed the collected data by using mean, standard deviation and two tailed t-test at 0.05 level of significance.

5.2 Finding of the Study

Analyzing and interpreting the collected data by using statistical procedure, the following results were found.

- i. The mean scores of secondary level students of Baglung and Kaski districts were 19.587 and 22.425 respectively. The mean score of the students of Kaski was higher than that of the students of Baglung district by 2.838. The calculated t-value ($t=2.62$) was

found greater than the tabulated t-value ($t=1.96$). Hence this difference in mean was found significant at 0.05 level.

- ii. The mean score of male students of Kaski and Baglung district were 23.125 and 19.7 respectively. The mean score of male students of Kaski district was higher than the students of Baglung district by 3.425. The calculated t-value ($t=2.03$) was found greater than the tabulated t-value ($t=1.98$). Hence this difference in means was found significant at 0.05 level.
- iii. The mean scores of female students of Kaski and Baglung districts were 21.725 and 19.47 respectively. The mean score of female students of Kaski district was higher than the students of Baglung district by 2.255. The calculated t value ($t=1.65$) was found less than the tabulated value ($t=1.98$). Hence, the difference in means was found in significant at 0.05 level.
- iv. The mean scores of rural students of Kaski and Baglung districts were 20.175 and 18.05 respectively. The mean score of rural students of Kaski district was higher than the students of Baglung district by 2.12. Since the calculated t-value ($t=1.55$), is smaller than the tabulated t-value ($t=1.98$), the difference in mean was in significant at 0.05 level.
- v. The mean scores of urban students of Kaski and Baglung districts were 24.675 and 21.125 respectively. The mean score of urban students of Kaski district was higher than the urban students of Baglung district by 3.55. Since the calculated t-value ($t=2.26$) was greater than tabulated t-value ($t=1.98$). Hence this difference in means was found significant at 0.05 level.

5.3 Conclusion

From the analysis of the study and the finding it can be concluded that Kaski district's students have got much learning opportunities than the students of Baglung district due to the many facilities such as well trained teachers, availability of enough reference books, instructional materials, good infrastructure and efficient class room management. After the gender wise analysis of the students' achievement the researcher concluded that girls even in young age have to support in much domestic works than the boys and parents concern is much to the sons' education than daughters'. The girls can not get more time for the learning and other re-creational activities as boys get. In comparison to the girls, boys are more free from the domestic works. They can give more time in education and other activities. Due to the above reasons achievement score of girls was found less than the achievement score of boys. An analysis on achievement score of female students of Baglung and Kaski districts, it has been found that achievement score of female students is insignificant at 0.05 level.

The mean scores of urban students in both Baglung and Kaski districts were found higher than rural students. From the finding of the students' achievement it can be concluded that the students of rural areas have to walk long distance to reach their school. So they don't have enough time to study. The parents of rural areas' students have low economic status in comparison to the parents of urban areas' students. Similarly, the parents of urban areas are more educated in comparison to the parents of rural areas.

5.4 Recommendations

On the basis of above study the researcher suggests the following recommendations for the improvement in mathematics instruction to get better achievement at secondary level.

- i. This study was limited only 8/8 school of Baglung and Kaski districts. To get more valid and generalized conclusion it is recommended that this type of study should be carried on an extensive scale.
- ii. The achievement score of Baglung district was found lower than that of Kaski district. Therefore, the concerned authority, educational policy makers, teachers and school management should pay special attention to promote the students' educational standard.
- iii. The mean achievement in mathematics of secondary level students of rural areas was found lower than that of urban areas. So it is recommended that the government should bring the special programmes for the benefit of secondary level students of rural areas to increase their achievement level.
- iv. The teachers, who are devoting themselves to effective teaching learning, should be evaluated and encouraged by administration.

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Appendix A

Achievement Test paper (For Pilot Test)

विषय : गणित

विद्यालयको नाम :

कक्षा : १०

विद्यार्थीको नाम :

समय : १ घण्टा

ठेगाना :

रोल नं

पु.अ : ५०

सबभन्दा ठीक उत्तरमा रेजा () चिन्ह लगाउनुहोस् ।

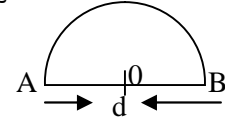
१. $n(A) \cap n(B) \subseteq n(A \cup B)$ सँग कुन बराबर हुन्छ ?
(क) $n(A \cup B)$ (ख) $n(A \cap B)$
(ग) $n(A \cap B)$ (घ) $n(A \cup B)$
२. यदि $U = \{1, 3, 5, 7, 9, 11, 13, 15, 17\}$, $A = \{1, 7, 9, 13\}$ र $B = \{3, 5, 11, 15\}$ भए $\overline{A \cap B}$ बराबर कुन हुन्छ ?
(क) $\{1, 3, 5, 7, 9, 11, 15, 17\}$ (ख) $\{3, 5, 11, 15, 17\}$
(ग) $\{1, 3, 5, 7, 9, 11, 13, 15\}$ (घ) $\{1, 7, 9, 13, 17\}$
३. यदि 5 kg चिनिको मुल्य रु. 190 पर्छ भने $\frac{1}{2}$ kg चिनिको मुल्य कति पर्ला ?
(क) रु. 90 (ख) रु 38 (ग) रु. 17 (घ) रु 19
४. रु 650 मा किनेको किताबलाई रु. 130 नाफा गरि बेच्दा कति प्रतिशत नाफा हुन्छ ?
(क) 5% (ख) 10% (ग) 15% (घ) 20%
५. यदि मिश्रधन (A), साँवा (P), समय (T) र व्याजदर (R) भए P निकाल्ने सूत्र कुन होला ?
(क) $\frac{P | T | R}{100}$ (ख) $\frac{A | T | R}{100}$
(ग) $\frac{A | 100}{100 \Gamma TR}$ (घ) $\frac{T | 100}{100 \Gamma AR}$
६. यदि रु 100 (IC) = रु 160 (NC) र 1 अमेरिकन डलर (\$) = रु. 75 (NC) भए रु. 75000 (IC) बराबर कति अमेरिकन डलर हुन्छ ?
(क) \$1600 (ख) \$1200 (ग) \$1800 (घ) \$2000
७. 16 लाई 20 बनाउँदा कति प्रतिशतले वृद्धि हुन्छ ?
(क) 80% (ख) 20% (ग) 25% (घ) 40%
८. कति व्याजदरमा रु 600 ऋण दिँदा 2 वर्षपछि रु. 72 व्याज पाइन्छ ?
(क) 8% (ख) 6% (ग) 12% (घ) 16%

९. रु 105 लाई 2:5 को अनुपातमा हुने गरि दुई भागमा बाँड्दा पहिलो भागमा कति रकम पर्ला ?
 (क) रु 35 (ख) रु 75 (ग) रु 30 (घ) रु. 15
१०. एउटा कक्षामा भएका विद्यार्थीहरूको 40% केटीहरू थिए । यदि केटीहरूको संख्या 16 भए त्यस कक्षामा कति विद्यार्थीहरू थिए ?
 (क) 40 जना (ख) 64 जना
 (ग) 24 जना (घ) 80 जना
११. एउटा क्याल्कुलेटरको अंकित मुल्य रु. 260 छ । उक्त क्याल्कुलेटर 5% छुटमा बेचियो भने वि.मु. कति होला ?
 (क) रु. 227 (ख) रु. 237 (ग) रु . 247 (घ) रु 257
१२. वार्षिक रु. 165000 कमाउने एउटा व्यक्तिको आश्रित परिवार संख्याका आधारमा रु. 120500 सम्ममा आयकर छुट छ । बाँकीमा 30% आयकर लाग्छ भने कति आयकर तिर्छ ?
 (क) रु. 44500 (ख) रु. 49500
 (ग) रु. 14850 (घ) रु. 13350
१३. $x(2x-y)$ बनाउन $x(x+3y)$ मा कति जोड्नु पर्ला ?
 (क) $2x(x-2y)$ (ख) $x(x-4y)$
 (ग) $x(3x+2y)$ (घ) $2x(x+y)$
१४. वर्ग समिकरण $px^2 + qx + r = 0$ को मूल कुन हो ?
 (क) $x \times \frac{Zp \{ \sqrt{p^2 - 4qr} \}}{2q}$ (ख) $x \times \frac{Zq \{ \sqrt{q^2 - 4pr} \}}{2p}$
 (ग) $x \times \frac{Zq \{ \sqrt{p^2 - 4qr} \}}{2q}$ (घ) $x \times \frac{\sqrt{p^2 - 4qr}}{2q}$
१५. यदि $5^y = 0.04$ भए y को मान कति हुन्छ ?
 (क) 0.02 (ख) 0.2 (ग) 2 (घ) -2
१६. $3x^3 - 12x$ को खण्डिकरण कुन हो ?
 (क) $3x(x+2)(x+2)$ (ख) $3x(x-2)(x-2)$
 (ग) $3x(x+2)(x-2)$ (घ) $(3x+x)(x-2)(x+2)$
१७. $(x+2b+c)^0$ को मान कति हुन्छ ?
 (क) 1 (ख) 0 (ग) 2 (घ) 3
१८. $\frac{1}{64}^{\frac{1}{6}}$ को मान कति हुन्छ ?
 (क) $\frac{1}{3}$ (ख) 0 (ग) $\frac{1}{6}$ (घ) $\frac{1}{2}$

१९. तलका मध्ये कुन रेखिय समिकरण हो ?
 (क) $x^2 + 2x - y = 7$ (ख) $2x + y = 4$
 (ग) $\frac{1}{2}x \Gamma 2 \times 5$ (घ) $9x^2 - 4y = 3^2$
२०. रेखा $3y - 2x + 4 = 0$ को भुकाव कति होला ?
 (क) $\frac{2}{3}$ (ख) $\frac{2}{5}$ (ग) $Z \frac{2}{3}$ (घ) $Z \frac{2}{5}$
२१. यदि $3^{x+1} \Gamma 3^x \times 108$ भए x को मान कति होला ?
 (क) 0 (ख) 1 (ग) 2 (घ) 3
२२. यदि $6a - 8b = 0$ भए $a : b$ को मान कति होला ?
 (क) 2 : 3 (ख) 3 : 4 (ग) 5 : 4 (घ) 4 : 3
२३. यदि $\triangle ABC$ मा $AB = 6\text{cm}$, $AC = 10\text{cm}$ र $B = 90^\circ$ भए उक्त त्रिभुजको क्षेत्रफल कति हुन्छ ?
 (क) 60cm^2 (ख) 32cm^2 (ग) 30cm^2 (घ) 120cm^2
२४. 44cm परिधि भएको वृत्तको अर्धव्यास कति हुन्छ ?
 (क) 14cm (ख) 10cm (ग) 7cm (घ) 4cm
२५. चारभित्ताको क्षेत्रफल निकाल्ने सुत्र कुन हो ?
 (क) $2l(b+h)$ (ख) $2h(l+b)$ (ग) $2b(l+h)$ (घ) $l|b$
२६. एउटा वृत्ताकार जग्गाको क्षेत्रफल 616m^2 छ भने अर्धव्यास कति होला ?
 (क) 7m (ख) 14m (ग) 21m (घ) 18m
२७. एउटा वर्गाकार चउरको परिमिति 148m भए सो चउरको लम्बाई कति होला ?
 (क) 37m (ख) 74m (ग) 296m (घ) 35m
२८. एउटा आयतकार पोखरीको लम्बाई र चौडाइको योगफल 105m भए परिमिति कति मीटर होला ?
 (क) 105m (ख) 210m (ग) 52.5m (घ) 420m

२९. दिइएको चित्रमा अर्धवृत्ताकार चित्रको परिमिति कति हुन्छ ?

(क) $\frac{fd}{2}$ (ख) $\frac{f}{2} \Gamma r$



(ग) $2\leftarrow$ (घ) $d \frac{f}{2} \Gamma 1$

३०. यदि समबाहु त्रिभुजको क्षेत्रफल $16\sqrt{3}\text{cm}^2$ भए उक्त त्रिभुजको परिमिति कति होला ?

(क) 16cm (ख) $8\sqrt{3}\text{cm}$ (ग) 18cm (घ) 24cm

३१. दिइएको चित्रमा छाया परेको भागलाई के भनिन्छ ?

(क) अर्धव्यास (ख) अर्धवृत्त



(ग) क्षेत्रक (घ) वृत्तखण्ड

A B

३२. तलका मध्ये कुन अवस्थामा दुइवटा त्रिभुजहरु अनुरूप हुँदैनन् ?

(क) भु.भु.भु. (ख) को.को.को (ग) भु.को.भु (घ) को.भु.को.

३३. समबाहु त्रिभुजका प्रत्येक भित्रीकोणहरु कति डिग्री हुन्छन् ?

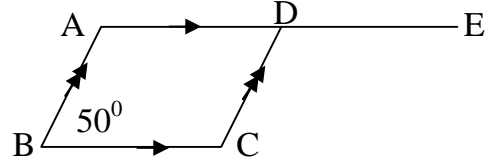
(क) 60^0 (ख) 45^0 (ग) 90^0 (घ) 30^0

३४. दिइएको स.च. ABCD मा AD लाई E सम्म लम्बाईको छ। यदि $B = 50^0$ भए

CDE को मान कति होला ?

(क) 50^0 (ख) 130^0

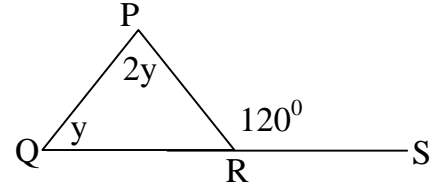
(ग) 30^0 (घ) 150^0



३५. दिइएको चित्रमा QPR को मान कति होला ?

(क) 40^0 (ख) 60^0

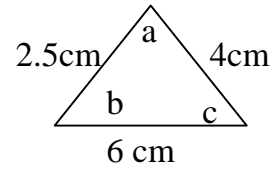
(ग) 80^0 (घ) 120^0



३६. दिइएको त्रिभुजमा सबैभन्दा सानो र सबैभन्दा ठूलो कोण क्रमशः कुन कुन हो ?

(क) c and a (ख) b and c

(ग) a and c (घ) a and b



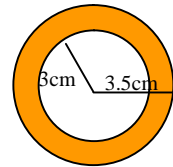
३७. चतुर्भुजका भित्रीकोणहरुको योगफल कति हुन्छ ?

(क) 540^0 (ख) 180^0 (ग) 90^0 (घ) 360^0

३८. दिइएको चित्रमा देखाइएको रिङको क्षेत्रफल कति होला ?

(क) 12.12cm^2 (ख) 10.21cm^2

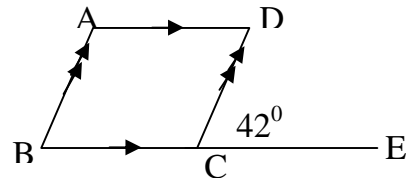
(ख) 3.5cm^2 (घ) 12.25cm^2



३९. दिइएको चित्रमा BAD को मान कति होला ?

(क) 42^0 (ख) 180^0

(ग) 140^0 (घ) 138^0

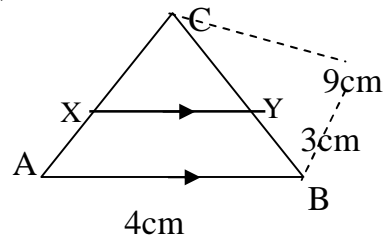


४०. दिइएको चित्रमा $\zeta ABC \sim \zeta XYZ$, $BC=9\text{cm}$, $YB = 3\text{cm}$ र $XY = 4\text{cm}$ भए

AB को लम्बाई कति होला ?

(क) 8 cm (ख) 9cm

(ग) 6 cm (घ) 12 cm



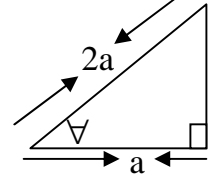
४१. यदि $4 \sin^2 A = 1$ भए A को मान कति होला ? ($0^\circ \leq A \leq 90^\circ$)
 (क) 90° (ख) 60° (ग) 45° (घ) 30°

४२. तलका मध्ये $\cot 45^\circ$ को मान कुन हो ?

(क) 1 (ख) $\sqrt{2}$ (ग) $\frac{\sqrt{3}}{2}$ (घ) $\frac{1}{\sqrt{2}}$

४३. दिइएको समकोण त्रिभुजमा \angle को मान कति डिग्री होला ?

(क) 60° (ख) 45°
 (ग) 30° (घ) 75°



४४. यदि $5 \sin \angle = 3$ भए $\cos \angle$ को मान कति होला ?

(क) $\frac{5}{3}$ (ख) $\frac{3}{5}$ (ग) $\frac{4}{3}$ (घ) $\frac{4}{5}$

४५. $\sin 45^\circ | 2 \cos 45^\circ$ को मान कति हुन्छ ?

(क) $\frac{1}{\sqrt{2}}$ (ख) $\sqrt{2}$ (ग) 1 (घ) 2

४६. 5, 11, 14, 10, 8 र 6 को मध्यक कति हुन्छ ?

(क) 10 (ख) 14 (ग) 7 (घ) 9

४७. 4, 6, 8, 11, 6, 8, 12, 6, 7, 13, 6 मा रीत (Mode) कति होला ?

(क) 8 (ख) 6 (ग) 13 (घ) 4

४८. तेस्रो चतुर्थांश (Q_3) पर्ने स्थान पत्ता लगाउन कुन सुत्र प्रयोग गरिन्छ ?

(क) $3 \frac{N \Gamma 1}{2}$ औं पद (ख) $\frac{N \Gamma 1}{4}$ औं पद

(ग) $\frac{N \Gamma 1}{2}$ औं पद (घ) $3 \frac{N \Gamma 1}{4}$ औं पद

४९. एउटा तासको प्याकेटबाट एउटा पत्ता नहेरी निकाल्दा एक्का नै पर्ने सम्भावना कति होला ?

(क) $\frac{1}{13}$ (ख) $\frac{1}{4}$ (ग) $\frac{4}{13}$ (घ) $\frac{1}{52}$

५०. एक जना गर्भवती महिलाले सोमबार नै बच्चालाई जन्म दिने सम्भाव्यता कति होला ?

(क) $\frac{2}{15}$ (ख) $\frac{1}{30}$ (ग) $\frac{3}{7}$ (घ) $\frac{1}{7}$

Appendix B
Achievement Test Paper

(For Final Test)

विषय : गणित

विद्यालयको नाम :

कक्षा : १०

विद्यार्थीको नाम :

रोल नं

ठेगाना :

समय : ४५ मिनेट

पु.अ :

सबभन्दा ठीक उत्तरमा रेजा () चिन्ह लगाउनुहोस् ।

१. $n(A) \cap n(B) \subseteq n(A \cup B)$ सँग कुन बराबर हुन्छ ?

(क) $n(A \cup B)$

(ख) $n(A \cap B)$

(ग) $n(A \cap B)$

(घ) $n(A \cup B)$

२. यदि $U = \{1, 3, 5, 7, 9, 11, 13, 15, 17\}$, $A = \{1, 7, 9, 13\}$ र $B = \{3, 5, 11, 15\}$ भए $\overline{A \cap B}$ बराबर कुन हुन्छ ?

(क) $\{1, 3, 5, 7, 9, 11, 15, 17\}$

(ख) $\{3, 5, 11, 15, 17\}$

(ग) $\{1, 3, 5, 7, 9, 11, 13, 15\}$

(घ) $\{1, 7, 9, 13, 17\}$

३. यदि 5 kg चिनिको मुल्य रु. 190 पर्छ भने $\frac{1}{2}$ kg चिनिको मुल्य कति पर्ला ?

(क) रु. 90

(ख) रु 38

(ग) रु. 17

(घ) रु 19

४. रु 650 मा किनेको किताबलाई रु. 130 नाफा गरि बेच्दा कति प्रतिशत नाफा हुन्छ ? (क) 5% (ख) 10% (ग) 15% (घ) 20%

५. यदि रु 100 (IC) = रु 160 (NC) र 1 अमेरिकन डलर (\$) = रु. 75 (NC) भए रु. 75000 (IC) बराबर कति अमेरिकन डलर हुन्छ ?

(क) \$1600

(ख) \$1200

(ग) \$1800

(घ) \$2000

६. 16 लाई 20 बनाउँदा कति प्रतिशतले वृद्धि हुन्छ ?

(क) 80%

(ख) 20%

(ग) 25%

(घ) 40%

७. कति व्याजदरमा रु 600 ऋण दिँदा 2 वर्षपछि रु. 72 व्याज पाइन्छ ?

(क) 8%

(ख) 6%

(ग) 12%

(घ) 16%

८. रु 105 लाई 2:5 को अनुपातमा हुने गरि दुई भागमा बाँड्दा पहिलो भागमा कति रकम पर्ला ?

(क) रु 35

(ख) रु 75

(ग) रु 30

(घ) रु. 15

९. एउटा क्याल्कुलेटरको अंकित मुल्य रु. 260 छ । उक्त क्याल्कुलेटर 5% छुटमा बेचियो भने वि.मु. कति होला ?

(क) रु. 227

(ख) रु. 237

(ग) रु . 247

(घ) रु 257

१०. वार्षिक रु. 165000 कमाउने एउटा व्यक्तिको आश्रित परिवार संख्याका आधारमा रु. 120500 सम्ममा आयकर छुट छ । बाँकीमा 30% आयकर लाग्छ भने कति आयकर तिर्छ ?

(क) रु. 44500 (ख) रु. 49500 (ग) रु. 14850 (घ) रु. 13350

११. वर्ग समिकरण $px^2 + qx + r = 0$ को मूल कुन हो ?

(क) $x \times \frac{-q \pm \sqrt{q^2 - 4pr}}{2p}$ (ख) $x \times \frac{-q \pm \sqrt{q^2 - 4pr}}{2q}$

(ग) $x \times \frac{-q \pm \sqrt{p^2 - 4qr}}{2q}$ (घ) $x \times \frac{-q \pm \sqrt{p^2 - 4qr}}{2p}$

१२. यदि $5^y = 0.04$ भए y को मान कति हुन्छ ?

(क) 0.02 (ख) 0.2 (ग) 2 (घ) -2

१३. $3x^3 - 12x$ को खण्डिकरण कुन हो ?

(क) $3x(x+2)(x+2)$ (ख) $3x(x-2)(x-2)$

(ग) $3x(x+2)(x-2)$ (घ) $(3x+x)(x-2)(x+2)$

१४. $(x+2b+c)^0$ को मान कति हुन्छ ?

(क) 1 (ख) 0 (ग) 2 (घ) 3

१५. $\frac{1}{64}^{\frac{1}{6}}$ को मान कति हुन्छ ?

(क) $\frac{1}{3}$ (ख) 0 (ग) $\frac{1}{6}$ (घ) $\frac{1}{2}$

१६. तलका मध्ये कुन रेखिय समिकरण हो ?

(क) $x^2 + 2x - y = 7$ (ख) $2x + y = 4$

(ग) $\frac{1}{2}x + 2x = 5$ (घ) $9x^2 - 4y = 3^2$

१७. रेखा $3y - 2x + 4 = 0$ को भुकाव कति होला ?

(क) $\frac{2}{3}$ (ख) $\frac{2}{5}$ (ग) $\frac{2}{3}$ (घ) $\frac{2}{5}$

१८. यदि $6a - 8b = 0$ भए $a : b$ को मान कति होला ?

(क) 2 : 3 (ख) 3 : 4 (ग) 5 : 4 (घ) 4 : 3

१९. 44 cm परिधि भएको वृत्तको अर्धव्यास कति हुन्छ ?

(क) 14 cm (ख) 10 cm (ग) 7 cm (घ) 4 cm

२०. चारभित्ताको क्षेत्रफल निकाल्ने सूत्र कुन हो ?

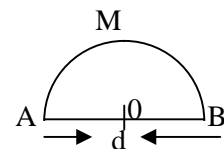
(क) $2l(b+h)$ (ख) $2h(l+b)$ (ग) $2b(l+h)$ (घ) $l|b$

२१. एउटा वृत्ताकार जग्गाको क्षेत्रफल 616 m^2 छ भने अर्धव्यास कति होला ?

(क) 7m (ख) 14 m (ग) 21m (घ) 18 m

२२. एउटा आयतकार पोखरीको लम्बाई र चौडाइको योगफल 105 m भए परिमिति कति मीटर होला ?

(क) 105m (ख) 210 m (ग) 525 m (घ) 420 m



२३. दिइएको चित्रमा अर्धवृत्ताकार चित्रको परिमिति कति हुन्छ ?

(क) $\frac{fd}{2}$ (ख) $\frac{f}{2} \Gamma r$

(ग) $2\left\langle \right\rangle$ (घ) $d \frac{f}{2} \Gamma 1$

२४. यदि समबाहु त्रिभुजको क्षेत्रफल $16\sqrt{3} \text{ cm}^2$ भए उक्त त्रिभुजको परिमिति कति होला ?

(क) 16 cm (ख) $8\sqrt{3} \text{ cm}$ (ग) 18 cm (घ) 24 cm

२५. तलका मध्ये कुन अवस्थामा दुइवटा त्रिभुजहरु अनुरूप हुँदैनन् ?

(क) भु.भु.भु. (ख) को.को.को (ग) भु.को.भु. (घ) को.भु.को.

२६. समबाहु त्रिभुजका प्रत्येक भित्रीकोणहरु कति डिग्री हुन्छन् ?

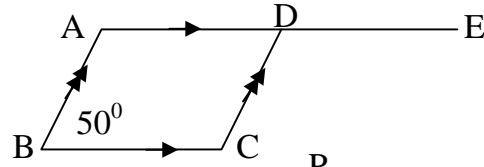
(क) 60^0 (ख) 45^0 (ग) 90^0 (घ) 30^0

२७. दिइएको स.च. ABCD मा AD लाई E सम्म लम्ब्याईको छ। यदि $B = 50^0$ भए

CDE को मान कति होला ?

(क) 50^0 (ख) 130^0

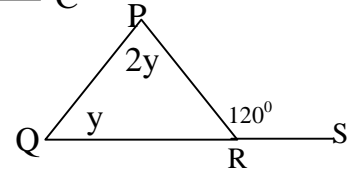
(ग) 30^0 (घ) 150^0



२८. दिइएको चित्रमा QPR को मान कति होला ?

(क) 40^0 (ख) 60^0

(ग) 80^0 (घ) 120^0

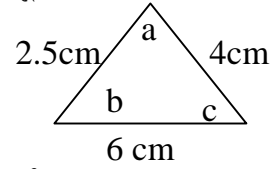


२९. दिइएको त्रिभुजमा सबैभन्दा सानो र सबैभन्दा ठूलो कोण क्रमशः

कुन कुन हो ?

(क) c and a (ख) b and c

(ग) a and c (घ) a and b



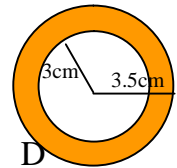
३०. चतुर्भुजका भित्रीकोणहरुको योगफल कति हुन्छ ?

(क) 540^0 (ख) 180^0 (ग) 90^0 (घ) 360^0

३१. दिइएको चित्रमा देखाइएको रिङको क्षेत्रफल कति होला ?

(क) 12.12 cm^2 (ख) 10.21 cm^2

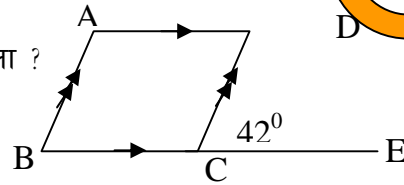
(ख) 3.5 cm^2 (घ) 12.25 cm^2



३२. दिइएको चित्रमा BAD को मान कति होला ?

(क) 42^0 (ख) 180^0

(ग) 140^0 (घ) 138^0

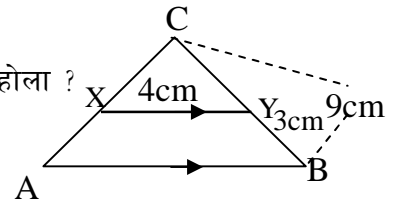


३३. दिइएको चित्रमा $\zeta ABC \sim \zeta XYZ$, $BC = 9 \text{ cm}$,

$YB = 3 \text{ cm}$ र $XY = 4 \text{ cm}$ भए AB को लम्बाई कति होला ?

(क) 8 cm (ख) 9 cm

(ग) 6 cm (घ) 12 cm



३४. यदि $4 \sin^2 A = 1$ भए A को मान कति होला ? ($0^0 \leq A \leq 90^0$)

(क) 90^0 (ख) 60^0 (ग) 45^0 (घ) 30^0

३५ तलका मध्ये $\cot 45^\circ$ को मान कुन हो ?

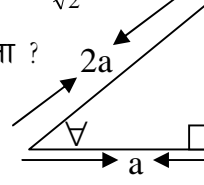
- (क) 1 (ख) $\sqrt{2}$ (ग) $\frac{\sqrt{3}}{2}$ (घ) $\frac{1}{\sqrt{2}}$

३६ दिइएको समकोण त्रिभुजमा \sphericalangle को मान कति डिग्री होला ?

- (क) 60° (ख) 45° (ग) 30° (घ) 75°

३७ यदि $5 \sin \sphericalangle = 3$ भए $\cos \sphericalangle$ को मान कति होला ?

- (क) $\frac{5}{3}$ (ख) $\frac{3}{5}$ (ग) $\frac{4}{3}$ (घ) $\frac{4}{5}$



३८ 5, 11, 14, 10, 8 र 6 को मध्यक कति हुन्छ ?

- (क) 10 (ख) 14 (ग) 7 (घ) 9

३९ 4, 6, 8, 11, 6, 8, 12, 6, 7, 13, 6 मा रीत (Mode) कति होला ?

- (क) 8 (ख) 6 (ग) 13 (घ) 4

४० एउटा तासको प्याकेटबाट एउटा पत्ता नहेरी निकाल्दा एक्का नै पर्न सक्ने सम्भावना कति होला ?

- (क) $\frac{1}{13}$ (ख) $\frac{1}{4}$ (ग) $\frac{4}{13}$ (घ) $\frac{1}{52}$

४१ एक जना गर्भवती महिलाले सोमबार नै बच्चालाई जन्म दिने सम्भाव्यता कति होला

- (क) $\frac{2}{15}$ (ख) $\frac{1}{30}$ (ग) $\frac{3}{7}$ (घ) $\frac{1}{7}$

Appendix -C
Name of Schools

Baglung

1. Shive Ma.Vi.Malma
2. Saraswoti Ma.Vi,Dudilabhathi
3. Ammarbhumi H.S School, Bihu
4. Tara Ma. Vi., Tarakhola
5. Shree kalika Kanya Ma.Vi., Baglung
6. Mulapani Higher Secondary School, Mulapani
7. Shree Lahare Pipal Ma. Vi., Laharepipal
8. Dhaulagiri Ma.Vi.Ratamata

Kaski

1. Udaya Ma.Vi. Dhampus
2. Sidha Baraha Ma.Vi. Thulakhet
3. Ratna Shova Ma. Vi, Maghthana
4. Mahendra Ma. Vi., Gharmi
5. Pardi Ma.Vi Mustang Chowk
6. Sanskrit Ma.Vi. Bagar
7. Mahendra Higher Secondary school, Nayabazaar
8. Shree Bindhyabasini Higher Secondary School, Barpatan.

Appendix D
Answer Key of Achievement Test Paper
(For Pilot Test)

Item Number	Answer	Item Number	Answer
01	घ	02	ख
03	घ	04	घ
05	ग	06	क
07	ख	08	ख
09	ग	10	क
11	ग	12	ख
13	ख	14	ख
15	घ	16	ग
17	क	18	घ
19	ख	20	क
21	घ	22	घ
23	ग	24	ग
25	ख	26	ख
27	क	28	ख
29	घ	30	घ
31	ग	32	ख
33	क	34	ख
35	ग	36	ग
37	घ	38	ख
39	घ	40	ग
41	ख	42	क
43	क	44	घ
45	ग	46	घ
47	ख	48	घ
49	क	50	घ

Appendix E
Answer Key of Achievement Test Paper
(For Final Test)

Item Number	Answer	Item Number	Answer
01	घ	02	ख
03	घ	04	घ
05	क	06	ख
07	ख	08	ग
09	ग	10	घ
11	ख	12	घ
13	ग	14	क
15	घ	16	ख
17	क	18	घ
19	ग	20	ख
21	ख	22	ख
23	घ	24	घ
25	ख	26	क
27	ख	28	ग
29	ग	30	घ
31	ख	32	घ
33	ग	34	ख
35	क	36	क
37	घ	38	घ
39	ख	40	क
41	घ		

Appendix F

Statistical Formulae used for Data Analysis

1. Mean $\bar{X} = \frac{\sum fX}{N}$
2. Standard Deviation $S = \sqrt{\frac{\sum fX^2 - \frac{(\sum fX)^2}{N}}{N}}$
3. T-Score (t)
$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

$$s_1^2 = \frac{\sum (x - \bar{x})^2}{n}$$

Where,

\bar{x}_1 = Mean of first sample

\bar{x}_2 = Mean of second sample

N_1 = No. of students in first sampled group.

N_2 = No. of students in second sampled group.

s_1^2 = Variance of the first sample

s_2^2 = Variance of the second sample

4. a. Difficulty level $p = \frac{U_R + L_R}{N} \times 100\%$
- b. Discrimination Index Level $D = \frac{U_n - L_n}{U_n + L_n} \times 100\%$

Where,

U_R = Correct Response of Upper 27% Students

L_R = Correct Response of lower 27% students

U_n = Total Number of Upper 27% students

L_n = Total Number of Lower 27% students.

N = Total number of items

Appendix G

Students, Sample of the Schools Obtained Marks

Kaski

Boys	27, 38, 27, 28, 37, 20, 13,36, 25,30,31 34, 18,8,25, 14, 13, 37, 28, 14, 32, 17, 17, 19, 27, 16, 28, 18, 26, 22, 28, 15, 16, 31, 12, 18, 21, 17, 29, 13
Girls	24, 27, 25, 26, 34, 16, 28, 32, 24, 23, 15, 14, 24, 22, 24, 17, 27, 39, 24, 19, 18, 15, 15, 13, 18, 17, 10 23, 20, 28, 16, 22, 25, 27, 25, 14, 20, 17, 16, 26.

Baglung

Boys	25, 18, 18, 33, 27, 11, 25, 15, 17, 12, 8, 21 24, 21 37, 15, 18 27, 23, 26,28, 20, 26, 22, 13,10, 22, 18, 13, 17, 27, 25, 08, 24, 11, 32, 17, 11, 13, 11,
Girls	17, 25, 16, 11, 18, 17, 23, 34, 23, 26, 12, 19, 24, 25, 26, 24, 25, 27, 18, 15, 16, 13, 13, 16, 17, 23, 26, 13, 18, 10, 28, 12, 26, 10, 14, 14, 28, 19, 27, 11.

Appendix H
LIST OF ABBREVIATION

CDC	- Curriculum Development Centre
CERID	- Research Centre for Educational Innovation and Development
CR	- Correct Response
FIMS	- First International Mathematics study
FOE	- Faculty of Education
IOE	- Institute of Engineering
NESP	- National Education System Plan
SD	- Standard Deviation
SIMS	- Second International Mathematics Study
UNESCO	- United Nations Educational Scientific and Cultural Organization