

# CHAPTER I

## INTRODUCTION

### 1.1 Background of the study

“Life is good for only two things, discovering mathematics and teaching mathematics.”

(Poisson, 1925)

“Mathematics has been derived from the ancient Greek word ‘mathancian’ meaning ‘to learn’ whereas in Nepali, it is called ‘Ganit’ which means ‘the science of calculation’. Nowadays, it is defined as ‘the science of numbers, quality and space, of which arithmetic, algebra, trigonometry, geometry etc are branches.’<sup>1</sup>

When we think of mathematics, we have in our mind a science devoted to the exploration of number, quantity, geometry and in modern times also including investigation into yet more abstract concepts of order, and into analogous types of purely logical relations. Mathematics is thought moving in sphere of complete abstraction from any particular instance of what it is taking about. The certainty of mathematics depends upon its complete abstract generality.<sup>2</sup>

Mathematics like language is a basic tool of communication. Daily transactions and communications involve the frequent use of mathematical concepts. Thus it is quite natural that mathematics be given a very important place, second to language, in school education. Students apply mathematical concepts, skills and logical reasoning to solve different kinds of problems not only as students but also as adults later on.<sup>3</sup>

Sidhu (1997) mentioned clearly about the importance of mathematics as follows:

Nowadays one cannot do without use of fundamental process of mathematics in daily life. A common person can get on some times very well without learning how to read and write but he can never pull on without learning how to count and calculate. The knowledge of mathematics fundamental process and skill, to use them are the preliminary requirements of a human being these days.

<sup>1</sup>. A.P. Cowie, *Oxford Advanced Learner's Dictionary 4th ed. Delhi, Oxford University Press 1991 p. 768*

<sup>2</sup>. "A. N. Whitehead, *Mathematics as an Element in the History of thought,*" *the World of Mathematics, USA, 1988, p 394*

<sup>3</sup>. *NESP Mathematics Curriculum, Kathmandu Nepal, 2030 p. 135*

Aggarwal (1992) states about the role of mathematics in different field as follows:

There is no science, no art and no profession, where Mathematics does not hold, a key position. The accuracy and exactness of a science is determined to a major extent by the amount of mathematics utilized in it. Even social science like economics, psychology, geography etc makes abundant use of mathematics. The gigantic works of construction of dams, bridge, other works of architect, building of ship, airplane and bombs etc, is possible only because of the quantitative science. Even medical men have to measure the doses, the blood pressure, the beat of pulse, the bodily temperature etc, most of natural science and philosophy are to be studied on mathematical lines and without the study of mathematics there would be no improvement in them. Even nature also embraces mathematics completely. The sunrise and sets at the specified moment. The stars appear at fix time. Mathematics runs in the vein of natural science like physics and astronomy this subject is inextricably incorporate with world and the natural phenomena.

The history of mathematics education in Nepal began from the Vedic period, earlier than 3000 BC. In the Vedic period teaching was done at Gurukul, Rishikul, Devkul and Petrikul. At that period mathematics was a part of education. One of Vedas called Rigved that treats mathematics.<sup>4</sup>

The Buddhist Philosophy came into existence, the monastery were used as the teaching place by the monks. The main subjects of study were 'Lipi' or 'Lekha' (alphabets, reading, and writing), Rupa (drawing) and Ganana (arithmetic).<sup>5</sup>

The formal school system, Buddha Pathasala at Ghantagrah (Clock Tower) in Kathmandu which was in existence even up to the year 2002 BS had included arithmetic as one of the content of teaching.<sup>6</sup>

The English system of education started with the establishment of Drabber School in the autumn of 1853 AD (27th Ashwin 1910) by Prime Minister Jang Bahadur Rana after his return from England. This school was located at Gol Baithak (Dakh Chok) in Thapathali Durbar educating the children limited to his family members only. The school had some European and some Indian teachers. Durbar School was affiliated with Calcutta University in 1877 AD started its teaching up to secondary level changing its name as Durbar High School where different subjects were taught including mathematics. From 1901 AD general public got the admission in Darbar High School.

<sup>4</sup>. L.N. Poudel, *Instructional process and Education in Nepal 2055*; p. 144

<sup>5</sup>. Bureau of Publication *Education in Nepal; Kathmandu college of Education, 1956, p. 1*

<sup>6</sup>. Gopi Nath Sarma, *School Curriculum in Nepal 1980, p. 33*

General Zeet Jang gave the permission to establish private Sanskrit school. Then Ranodeep Singh established as astronomy and arithmetic was taught in the Sanskrit Pathsala. Mathematics as astronomy and arithmetic was taught in the Sanskrit Pathalala. Under the enlarged education system, Dev Shamsheer opened sixteen governmental schools in 1957 BS. Mathematics occupied the important position in the syllabus at that time. The course of Sresta Pathsala in 1962 BS also had included arithmetic in the curriculum.<sup>7</sup>

Only after the organization of SLC examination board (Nov. 1, 1932) courses of study were framed in Nepal for SLC level. That first curriculum for secondary level had included compulsory mathematics of 100 marks along with additional mathematics as one of the optional subjects of 100 marks. The vocational training started with the name of Adhar Shiksha (1947 AD) had given emphasis on mathematics. For the SLC examination of 2005 BS in place of compulsory mathematics, arithmetic (50 marks) and Nepali Sresta (50 marks) or domestic arithmetic (50 marks) were introduced.<sup>8</sup>

SLC examination was conducted in Kathmandu for the first in 1929 AD, but only in 1934 AD the board of SLC was established in Nepal. SLC pass is considered as one of the most important minimum prerequisite for government employment, and for getting access to higher education. Because of this importance given to the SLC examination, it has become the terminal goal of secondary level school education in Nepal.<sup>9</sup>

The declaration of "ISTIHAR" in 1996 BS, The rules and the regulations for opening the schools was a beginning towards opening school legally by the interested private educators with some limitation and obligation. With this declaration, some private schools were established. And by the end of 1997 BS, two types of schools private and public came into existence.<sup>10</sup>

The growing social demands for education resulted in the rapid expansion of school through the country. In 2011 BS the Nepal Nation Education Planning Commission reported that the number of government schools was 84 and most of schools of Nepal charged fees and admitted pupils selectively.<sup>11</sup>

<sup>7</sup>. Ministry of Education, "School Observation", BPEP, 2053, p. 165

<sup>8</sup>. Bureau of Publication, "Education in Nepal" College of Education, Government of Nepal, Katmandu, 956, p. 3

<sup>9</sup>. CERID secondary Education and SLC Examination: An Employment Perspective (A study report, T.U. Katmandu: 1996, p.5

<sup>10</sup>. National Education System Plan (NESP), 2028, p. 3

<sup>11</sup>. Nepal Secondary Education Project, "control and management of private schools of Nepal, 1998, p. 1

NESP had clearly defined objectives of mathematics education in primary level to secondary level. The extra mathematics as optional subject of 100 marks also had been kept in secondary level for willing and worthy students and courses of optional mathematics for SLC were designed NESP 1971 which is still in practice in the present curriculum. Under NESP system privately functioned schools were brought by law under the wing of the government. Unfortunately, despite the NESP being demanding and timely plan, could not be sustained because it turned out to be costly plan for the government. Government resources and funds could not meet ever growing cost of education under NESP. Consequently, the government adopted a policy of privatization in school system. Interested individuals were encouraged to open schools in private sector. Thus the private schools rapidly increased from 2038 BS on wards in the kingdom and they are playing crucial role to provide quality education to students of the present Nepal.<sup>12</sup>

SLC examination has assumed a key position in the secondary education system of Nepal. Parents are used to in evaluating the quality education of school in term of SLC results. They are aware of the fact that the private schools are always better than public schools in terms of SLC results. The Nepal secondary education project 1998 AD shows that 84% of the students appeared in SLC examination passed from private school and 20% of the students passed SLC examination from public schools. Till now it is a question which student (private and public) scores better in mathematics. The achievements of public schools are not satisfactory as compared with the achievement of private school on the basis of the result on SLC examination which has been shown in the following table<sup>13</sup>.

Result of SLC examination in Nepal from 2060 to 2065

Year	Private school			Public school		
	Participate	Passed	Passed%	Participate	Passed	Passed%
2060	36782	30497	82.91	138636	50511	40.60
2061	40760	33355	81.83	171313	49534	33.33

2062	46629	40161	86.12	174310	63535	41.27
2063	52022	47213	90.75	217038	111948	56.38
2064	59946	53832	89.89	247132	141857	61.57
2065	66881	60751	90.83	269025	171202	63.63

<sup>12</sup>. Ministry of Education, School Observation, BPEP, 2053, p. 26

<sup>13</sup>. Kaski Shaichhik Darpan 2066, District Education Office Kaski, p 22

The number of private schools is 197 with 146363 students and the number of public schools is 434 with 76765 students at Kaski district in the academic year 2066 BS. The admission of students in public school is slowly decreasing and attracting towards private schools. The public school will have to face challenges due to the motivation of parents towards private schools and poor educational management of public school.<sup>14</sup>

The result of SLC examination in Kaski District from 2061 to 2065

Year	Private school			Public school		
	Participate	Passed	Passed%	Participate	Passed	Passed%
2061	2200	2012	91.45	4193	1331	38.89
2062	2497	2408	96.43	4061	1910	47.03
2063	2919	2814	96.40	4642	3194	68.80
2064	3228	3139	97.24	4838	2463	50.90
2065	3629	3460	95.34	5036	2520	50.03

Though, there are same academic years, same curriculum, total teaching period, prospective graduate teachers, text books and examination, the majority of people are in favor of private schools rather than public schools. The passed percent of private schools is greater than the passed percent of public schools in the result of SLC examination at Kaski District in every year.<sup>15</sup>

The result shows that achievements of private school students are greater than the achievement of public students on SLC examination. Hence this study tries to drive whether the achievement on mathematics of private school students is greater than the achievement on mathematics of public schools students in SLC examination in Pokhara sub-metropolis.

<sup>14</sup> Kaski Shaichhik Darpan 2066, District Education Office Kaski, p 23

<sup>15</sup> Kaski Shaichhik Darpan 2066, District Education Office Kaski, p 23

## **1.2 Statement of problem**

This study is mainly concerned with the comparison of the mathematics achievements of the students from private and public secondary schools located in Pokhara sub-metropolis on the basis of scores obtained in SLC examination in the academic year 2066.

This study will answer the following questions:

1. Does the mathematics achievement of students differ in private schools and public schools?
2. Does the mathematics achievement of students differ with respect to gender wise in private schools and public schools?
3. What are the causes of the difference on the mathematics achievement of the students?

## **1.3 Objectives of the study**

The objectives of the study are given below:

1. To compare the mathematics achievement of students in private schools and public schools.
2. To compare the mathematics achievement of students with respect to gender wise in private schools and public schools.
3. To find out the causes of difference on the mathematics achievement of the students.

## **1.4 Significance of the study**

Mathematics has a significant place at all level of school education. Although, mathematics is a compulsory subject at secondary level, having same curriculum, similar examination system, total teaching period, graduate teachers and evaluation system, people at large extent are found to be compared the achievement of private schools with the achievement of public schools. Observation of the results of the SLC examination up till now shows that higher rate of students is passed by from the private schools where as the public school students are getting low rate. Therefore, the researcher tried to investigate whether there existed the difference in the mathematics achievement of private school students and public school students in SLC examination in the academic year 2066.

This study has some of significance as follows:

1. The research gives the name of list and address of all secondary schools in Pokhara sub-metropolis in the academic year 2066.
2. Since none of the research is done to compare the mathematics achievement of students within Pokhara sub-metropolis, it is considerably valuable for the proper consequences.
3. It is one of the measuring ways of student achievement in mathematics.
4. The researcher also expected that the outcomes of the study will be useful mostly for the people working in the field of education.
5. The study has implication for policy and practice in educational sector.

## **1.5 Statement of Hypothesis**

This study attempted to seek the result of following research hypothesis and statistical hypothesis

### **1.5.1 Research Hypothesis**

1. Is there significant difference in mathematics achievement of private schools and public schools?
2. Is there significant difference in mathematics achievement with respect to gender wise in private schools and public schools?

### 1.5.2 Statistical Hypothesis

1.  $H_0: \mu_1 = \mu_2$  (null hypothesis)

$H_1: \mu_1 > \mu_2$  (alternative hypothesis)

where  $\mu_1$  and  $\mu_2$  are the corresponding parametric means of mathematics scores of students in the private schools and public schools.

2.  $H_0: \mu_3 = \mu_4$  (null hypothesis)

$H_1: \mu_3 > \mu_4$  (alternative hypothesis)

where  $\mu_3$  and  $\mu_4$  are the corresponding parametric means of mathematics scores of boys in private schools and girls in public schools.

3.  $H_0: \mu_5 = \mu_6$  (null hypothesis)

$H_1: \mu_5 > \mu_6$  (alternative hypothesis)

where  $\mu_5$  and  $\mu_6$  are the corresponding parametric means of mathematics scores of girls in private schools and boys in public schools.

4.  $H_0: \mu_7 = \mu_8$  (null hypothesis)

$H_1: \mu_7 > \mu_8$  (alternative hypothesis)

where  $\mu_7$  and  $\mu_8$  are the corresponding parametric means of mathematics scores of boys in private schools and boys in public schools.

5.  $H_0: \mu_9 = \mu_{10}$  (null hypothesis)

$H_1: \mu_9 > \mu_{10}$  (alternative hypothesis)

where  $\mu_9$  and  $\mu_{10}$  are the corresponding parametric means of mathematics scores of girls in private schools and girls in public schools.

6.  $H_0: \mu_{11} = \mu_{12}$  (null hypothesis)

$\mu_{11} > \mu_{12}$  (alternative hypothesis)



where  $\mu_{11}$  and  $\mu_{12}$  are the corresponding parametric means of mathematics scores of boys in private schools and boys in private schools.

7.  $H_0: \mu_{13} = \mu_{14}$  (null hypothesis)

$\mu_{13} > \mu_{14}$  (alternative hypothesis)

where  $\mu_{13}$  and  $\mu_{14}$  are the corresponding parametric means of mathematics scores of girls in public schools and girls in public schools.

## 1.6 Limitation of the study

The study has the following limitations:

1. The study was limited to compulsory mathematics.
2. The study was limited to Pokhara sub-metropolis.
3. The study was limited to the result of SLC examination in academic year 2066 BS.
4. The study was limited to the Mark ledger.
5. The study was limited to the secondary schools.
6. Seven private secondary schools and five public secondary schools were selected.
7. Ten students from each sample schools were selected randomly.
8. Equal number of boys and girls were selected randomly.

## 1.7 Definition of the Terms

*Achievement:* Achievement in this study is defined in terms of the scores obtained by the students on school leaving certificate examination in 2066 BS.

*Public schools:* Schools that are established and sponsored by Nepal government.

*Private schools:* The schools without any aid from the government are run by private investment by individuals, unions, agencies and any particular group<sup>16</sup>.

*School Leaving Certificate (SLC):* Student, who have completed their study in secondary school level, have to pass, respectively, the secondary level examination which are conducted annually by ministry of education and office of controller examination.<sup>17</sup>

*Sub-metropolis:* At least one hundred thousands population and at least one hundred million yearly incomes with essential urban facilities like higher education, electricity, and health service etc.<sup>18</sup>

<sup>16</sup> *Report of higher education commission 2055, page 35.*

<sup>17</sup> *Education information of Nepal 2000, p. 48.*

<sup>18</sup> *Gyaneshor Bhattari, Encyclopidia, General knowledge and social studies, 2067, p. 212.*

## **CHAPTER II**

### **REVIEW OF RELATED LITERATURE**

A review of related literature has taken the research task to be undertaken in a better perspective. The revision has helped to make the concept clear for the study and also directed to analyze and interpret the data. The revision has provided the researcher the best ways to conduct the study. The revision has been also conducted to avoid unintentional duplication of well established findings. Such a study, so far as the researcher's knowledge concerned, has not yet been made in mathematics achievement of private and public school students in school leaving certificate

examination in Pokhara sub-metropolis. Despite the fact, few related literature has been reviewed as follows:

Afolabi, A. O., Oyo state college of education, Oyo 2001, has conducted a study on “comparison of private and public schools product’s performance in mathematics and English language from educational technology perspective”. This study generally intended to find out the academic performance of students in schools, Bodija Ibadan.

The study examined the following objectives:

1. Whether the students who were products of private school will perform better in Mathematics than their colleagues who attended public school.
2. Whether the students who were products of private school will perform better in English Language than their colleagues who attended public school..

All the students of schools at Bodija Ibadon area constituted the population for the study. The study involved 100 students with 50 having come in from private primary school and the other 50 from public primary school. The instrument for the study is the teacher made test in Mathematics and English. The sampled students were exposed to two achievement tests in Mathematics and English Language. The data collected were subjected to t-test statistical analysis at 0.05 significant levels. Both tests are objective test with each question having five alternative answers.

The data collected with the research instrument were analyzed and found mean scores, standard deviation and t-value.

The following results were drawn:

1. The mean mathematics score of private school product was 17.52 and the mean mathematics score of public school product was 10.54. The calculated t-value was 19.39 which was greater than tabulated t-value 1.98. Hence, there was a significant difference in the mathematics scores of pupils from private schools and those from public schools.
2. The mean English language score of private school product was 19.24 and the mean English language score of public school product was 10.54. The calculated t-value was 38.18 which was greater than tabulated t-value 1.98. Hence, there was a significant difference in the English language scores of pupils from private schools and those from public school in English language.

The findings of the research showed that:

1. Students who attended private primary schools was better in Mathematics than those who attended public primary schools.
2. Students who attended private primary schools performed was better in English language than those who attended public primary schools.

The study recommended that to find out the causes in difference score of pupils from private schools and public at Bodija, Ibadon.

Academia Arena, Ghana 2009, has prepared a research on “comparative performance of day and boarding students in secondary school certificate mathematics examination”. The purpose of this work was to see the performance of a student been a day student or boarding student in relation to his/her senior secondary school mathematics examination. The research was conducted in the Kassena-Nandana District in Upper East Region and the Asuogyaman District in the Eastern Region of Ghana. Four out of eleven secondary schools in these districts were selected for this study. Two schools each were selected from the each district. The data collected were subjected to t-test statistical analysis at 0.05 significant levels. The study revealed that there was a significant difference between a student been a boarding student and day student.

Pokhrel, Arjun 2005, has conducted a research on “a comparative study of mathematics achievement of students in primary level from community based schools and public schools in Kathmandu district”. The population of the study consisted three community based schools and selected teachers, parents, schools management committee’s member and students of grade five from Kathmandu district were taken to sample. The schools were selected as purposively from urban, semi-urban and rural areas.

The main objectives of the study were:

1. To compare the mathematics achievement of students from community based schools and public schools.
2. To compare the mathematics achievement of students from community based schools with respect to gender.
3. To compare the mathematics achievement of students from public schools with respect to gender.
4. To identify teacher’s attitude towards schools management system of community based schools and public schools.

5. To identify student's attitude towards schools management system of community based schools and public schools.

Descriptive analysis was applied to analyze the teachers and students attitude towards the schools management system. The t-test was applied to compare the mathematics achievement between community based schools and public schools as well as gender-wise comparison with schools respectively at 0.05 level of significance.

Teachers had positive attitude towards the schools management system of community based schools than public schools, students had positive attitude towards the schools management system of community based schools than public schools, there was no significant mean difference between the primary level student from community based schools and public schools, there was no significant mean difference between the primary level students from community based schools with respect to gender, there was significant mean difference between the primary level students from public schools with respect to gender.

This study can be extensively done to acquire more valid and reliable information extending it to national level, student oriented activities are must to make teaching and learning more fruitful. There must be active participation of parents in school and management committee should be devoted to increase the quality of education.

Thapa, Dil bahadur 2005, has conducted a study on "a comparative study of secondary level students' achievement in mathematics between private and public school at Buwal municipality of Rupandehi district".

This study attempts was conducted on the basis of following objectives:

1. To find out the achievement on mathematics among the secondary level students of private and public schools.
2. To compare the students' achievement on mathematics at private and public schools.
3. To compare the achievement on mathematics by gender difference.
4. To find some of the factors which affect in students' achievement.

The study was limited to the 'Butwal Municipality' of Rupandehi district. Eight private schools out of thirty private schools were selected randomly. But, in case of public schools, all eight schools were considered, 20 students (10 boys and 10 girls) from each school were selected randomly. Students studying at tenth grade were considered as sample population of this research. The mathematics achievements were examined and were compared among 320 students (160 from each type of school i.e. private and public). The economic and educational statuses of parents were also

considered as the supplementary primary data. A set questionnaire for students and a set questionnaire for parents were prepared in order to collect the data.

The test items for achievement test were developed by the researcher. It was constructed based on the secondary mathematics curriculum prescribed by Nepal government. All the question items were of objective types, i.e. multiple-choice items having three distracters and one correct answer and were based on different levels of cognitive domain.

The statistical techniques used in this study were mean scores, standard deviation and two tailed t-test. The t-test was used to test whether there is significant difference or not in the mean scores of students in mathematics studying at tenth grade. All the tests were tested at 0.05 level of significance.

Based on the interpretation and analysis of the data, the following results were found.

1. The analysis of the mathematics achievement score obtained by students in the test-paper showed that 47.5 percent of the students scored distinction, 30.32 percent first division, 13.13 percent second division, 5.32 percent third division and only 3.13 percent failed.
2. The mean score of private school students and public students were 40.45 and 33.68 respectively. The mean score of private school students was higher than the public school students. This showed the significant difference at public and private school students in their achievement.
3. Moreover, boys and girls of all sampled population possessed similar achievement rate and no significant difference in their achievement was found.
4. When students' mean achievement was compared by the educational status of the parents, it was observed that the students whose parents were educated performed good performances than the students whose parents didn't have schooling. Similarly, when it was compared by the occupation of the parents, it was found that the students whose parents had good job and could afford better facilities performed better than those whose parents had low income.

Shrestha (1991), has conducted a study on the topic "A study of sex difference in achievement in mathematics of ninth grade students in Gorkha district". The researcher prepared two set up tools, which are achievement test and questionnaire and administered them to two hundreds eighty students of five schools. The researcher applied t-test to conclude that boy devote more time than girls at home study for mathematics together with all subjects and boy performed better than girls in mathematics achievement.

Pradhan (1993), has conducted a study on “A comparative study at the performance level of student of public and private primary schools”. The study concluded that the achievement level of the students of private primary school in mathematics was higher than those of the students of public primary schools. The researcher observed question/answer method of teaching which was common to both public and private schools. Methods such as demonstration, group discussion, role play and problem solving were used most frequently in private schools that in the public schools.

Pandey (1999), has conducted a research on “A comparative study of teaching activities and achievement in mathematics of the pupils of public and private lower secondary schools of Birendra Nagar Municipality, Surkhet”. The researcher showed that the difference of activity ratios of the pupils of public and private schools was found to be significance but the mean difference of the achievement of the pupils of schools was found to be significant.

Neupane (2001), has conducted a research on “A comparative study of mathematics achievement of students on ninth grade on the topic function of secondary level in Kathmandu district” . The researcher concluded that the mean achievement of the students of private schools was found to be significant than the mean achievement of the students of public schools and achievement of boys was greater than that girls.

The reviewed literature revealed that the achievement scores of students of private schools were found higher than public schools of particular region of Nepal. So, the researcher analyzed whether the same trends of mathematics achievement level of students in SLC examination of public schools and private schools in Pokhara sub-metropolis.

## **CHAPTER III**

### **METHODOLOGY**

This study was basically a comparative study of compulsory mathematics achievement of private and public secondary school students in School Leaving Certificate examination in Pokhara sub-metropolis. In this section, researcher included detail description of the manner in which decisions have been made about the type of data needed for the study, instruments and devices used for their collection and the method by which they had been collected. The researcher has analyzed the compulsory mathematics scores obtained by students of private secondary schools and public secondary schools appeared in School Leaving Certificate examination in the academic year 2066.

The methodology of this research has been divided as Population of the study, Sample of the study, Instruments, Data collection procedures and Data analysis procedure.

### **3.1 Population of the study**

The population of the study was the students who appeared in School Leaving Certificate examination in private secondary school and public secondary school in Pokhara sub-metropolis in the academic year 2066. There were 92 private secondary schools and 20 public secondary schools out of 112 secondary schools in Pokhara sub-metropolis in the academic year 2066 which have been shown in Appendix I. The total population of this study was 10727 students, out of which 6542 students was from private secondary schools and 4185 was from public secondary schools.<sup>19</sup>

### **3.2 Sample of the study**

When employing the method of selecting a probability sample, the researcher prepared two separate list of 92 private secondary schools and 20 public secondary schools in Pokhara sub metropolis.

<sup>19</sup> Ministry of Education, Kaski Shaichhik Darpan, District Education Office 2066.

Those two lists were considered as two stratus. From each of which, 7 private secondary schools and 5 public secondary schools out of 12 secondary schools have been chosen by using the



lottery method, which have been shown in Appendix II. 10 students were chosen with 5 boys and 5 girls from each selected schools by lottery method. Then the researcher visited those selected schools and mathematics teacher of the selected secondary schools. Those selected students and mathematics teacher of those sample schools were respectively decided to take as the sample students and sample mathematics teachers.

### **3.3 Instruments of the study**

The researcher had to select the available tools, which provided data for the testing of the hypothesis. The achievement of the objectives and the verification of the hypothesis of this study required tools to collected data. Mark ledger of the private secondary school students and the public secondary school students acquired in mathematics in School Leaving Certificate examination and questionnaire for the mathematics teacher were the main tools for this study. The table and Pie-chart have been used to compare the mean scores of students in private and public secondary schools. Questionnaire for teacher has been used for the primary data which have been shown in Appendix IV and the responses of the teacher has been categorized in four groups and presented in percentage table and bar diagram.

### **3.4 Data collection procedure**

The researcher have visited to District Education Officer, at this time the researcher used the Mark ledger of those schools which have been selected to collect compulsory mathematics scores of private and public secondary school students in School Leaving Certificate examination in the academic year 2066. The researcher has visited the schools and requested to fill the questionnaire to the mathematics teacher of each selected schools with the permission of principal showing the letter from the Mathematics Department of Prithvi Narayan Campus. After five days, the researcher again visited the concerned schools to collect filled questionnaire.

### 3.5 Data analysis procedure

The sets of collected data of mathematics scores of students have been subjected to statistical analysis and interpretation. The data have been categorized and presented into necessary tables and analyzed by using statistical tools that were mean, standard deviation and z-value. The researcher have been used z-test to find out the significant difference between mean scores of mathematics achievement of students in private secondary schools and public secondary schools as well as mathematics achievement with respect to gender wise which have been shown in Appendix III. In the case of two normal populations with unknown variance for independent sample, the z-test has been used to compare the compulsory mathematics achievement in the form,

$$z = \frac{\bar{x}_1 - \bar{x}_2}{s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

where,

$$s_p = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}$$

The hypothesis have been tested at 0.05 level of significance i.e. 95 percent confidence level, where  $n_1$  and  $n_2$  are the number of items in the first and second sample respectively. The mean scores of secondary school students have been shown in percentage Pie-chart.

The responses of the mathematics teacher have been presented in the table mentioned below. Then the responses of the mathematics teacher have been categorized in four groups and presented in percentage table and bar diagram.

Items of questionnaire	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

## CHAPTER IV

### ANALYSIS AND INTERPRETATION

The collected data have been tabulated, organized, analyzed and interpreted by the help of some statistical techniques.

For this study, the z-test has been applied to compare the mathematics achievements of private and public secondary school students acquired in School Leaving Certificate examination in Pokhara sub-metropolis in the academic year 2066 and similar test of these both school students has been applied to compare with respect to gender wise. The responses of teacher from filled questionnaire has been used to find out the physical facilities and teaching learning process in their schools.

The analysis of the study has been carried out under the following major sections:

1. Comparison of compulsory mathematics achievement of private secondary school students and public secondary school students
2. Comparison of compulsory mathematics achievement of boys in private secondary schools and girls in public secondary schools.
3. Comparison of compulsory mathematics achievement of girls in private secondary schools and boys in public secondary schools.
4. Comparison of compulsory mathematics achievement of boys in private secondary schools and boys in public secondary schools.
5. Comparison of compulsory mathematics achievement of girls in private secondary schools and girls in public secondary schools.
6. Comparison of compulsory mathematics achievement of boys and girls in private secondary schools.
7. Comparison of compulsory mathematics achievement of boys and girls in public secondary schools.
8. Responses of secondary school mathematics teachers on physical facilities in thier schools.
9. Responses of secondary mathematics teachers on teaching learning process in thier schools.

#### 4.1 Comparison of compulsory mathematics achievement of private secondary school students and public secondary school students

The researcher has analyzed the compulsory mathematics scores of 120 students from randomly selected 7 private secondary schools and 5 public secondary schools in Pokhara sub-metropolis. The mean, standard deviation and corresponding z-value of the compulsory mathematics scores of private secondary school students and public secondary school students have been presented in the following table.

Table 4.1

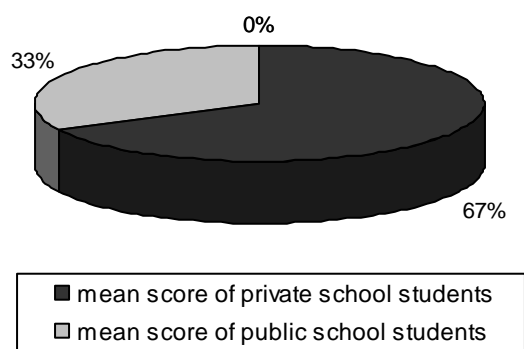
The mean scores of private school students and public school students

Group compared	Sample size	Mean	Standard deviation	Mean difference	z-cal.	z- cri.
Private school students	70	86.73	10.66	44.97	15.45	1.645
Public school students	50	41.76	20.17			

The above table shows that the mean scores of private secondary school students and public secondary school students at secondary level are 86.73 and 41.76 respectively. Therefore, the mean achievement of private secondary school students is greater than the mean achievement of public secondary school students by 44.97. The standard deviation of private secondary school students and public secondary school students are 10.66 and 20.17 respectively. The calculated z-value 15.45 by mean and standard deviation is greater than the tabulated z-value 1.645 at 0.05 level of significance. Hence, the mean achievement on compulsory mathematics of private secondary school students is greater than the mean achievement on compulsory mathematics of public secondary school students.

Pie-chart 4.1

The mean scores of private school students and public school students



#### 4.2 Comparison of compulsory mathematics achievement of boys in private secondary schools and girls in public secondary schools

The researcher has analyzed the mathematics scores of 35 boys in private secondary schools and 25 girls in public secondary schools to compare the compulsory mathematics achievements of boys in private secondary schools and girls in public secondary schools. The mean, standard deviation and corresponding z-value of the score obtained by boys in private secondary schools and girls in public secondary schools have been presented the table.

Table 4.2

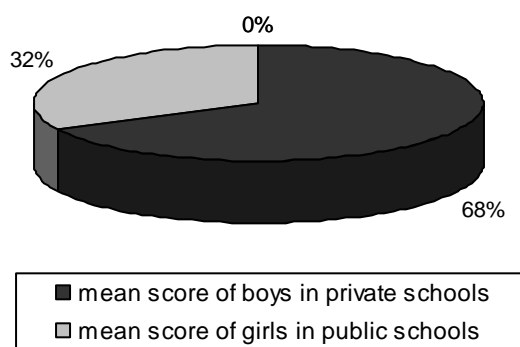
The mean scores of boys in private schools and girls in public schools

Group compared	Sample size	Mean	Standard deviation	Mean difference	z-cal.	z- cri.
Private school boys	35	87.05	10.77	45.17	11.07	1.645
Public school girls	25	41.88	20.77			

The above table shows that the mean mathematics scores of boys in private secondary schools and girls in public secondary schools are 87.05 and 41.88 respectively. Therefore, the mean achievement difference of boys in private secondary schools and girls in public secondary schools is 45.17. The standard deviation of mathematics achievement of boys in private secondary schools and girls in public secondary schools are 10.77 and 20.77 respectively. The calculated z-value 11.07 by mean and standard deviation is greater than the tabulated z-value 1.645 at 0.05 level of significance. Hence, the mean achievement on compulsory mathematics of boys in private secondary schools is greater than the mean achievement on compulsory mathematics of girls in public secondary schools.

Pie-chart 4.2

The mean scores of boys in private schools and girls in public schools



#### 4.3 Comparison of compulsory mathematics achievement of girls in private secondary schools and boys in public secondary schools

The researcher has analyzed the mathematics scores of 35 girls in private secondary schools and 25 boys in public secondary schools to compare the compulsory mathematics achievements of girls in private secondary schools and boys in public secondary schools. The mean, standard deviation and corresponding z-value of the score obtained by girls in private secondary schools and boys in public secondary schools have been presented in the table.

Table 4.3

The mean scores of girls in private schools and boys in public schools

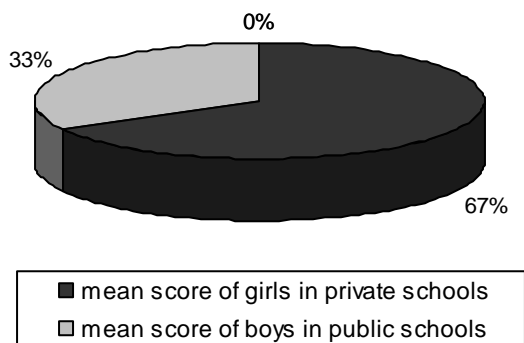
Group compared	Sample size	Mean	Standard deviation	Mean difference	z-cal.	z- cri.
Private school girls	35	86.40	10.54	43.72	11.42	1.645
Public school boys	25	42.68	19.18			

The above table shows that the mean mathematics scores of girls in private secondary schools and boys in public secondary schools are 86.40 and 42.68 respectively. Therefore, the mean achievement difference of girls in private secondary schools and boys in public secondary schools is 43.72. The standard deviation of mathematics achievement of girls in private secondary schools and boys in public secondary schools are 10.54 and 19.18 respectively. The calculated z-value 11.42 by mean and standard deviation is greater than the tabulated z-value 1.645 at 0.05 level of significance

Hence, the mean achievement on compulsory mathematics of girls in private secondary schools is greater than the mean achievement on compulsory mathematics of boys in public secondary schools

Pie-chart 4.3

The mean scores of girls in private schools and boys in public schools



#### 4.4 Comparison of compulsory mathematics achievement of boys in private secondary schools and boys in public secondary schools

The researcher has analyzed the mathematics scores of 35 boys in private secondary schools and 25 boys in public secondary schools to compare the compulsory mathematics achievements of boys in private secondary schools and boys in public secondary schools. The mean, standard deviation and corresponding z-value of the score obtained by boys in private secondary schools and boys in public secondary schools have been presented in the table.

Table 4.4

The mean scores of boys in private schools and boys in public schools

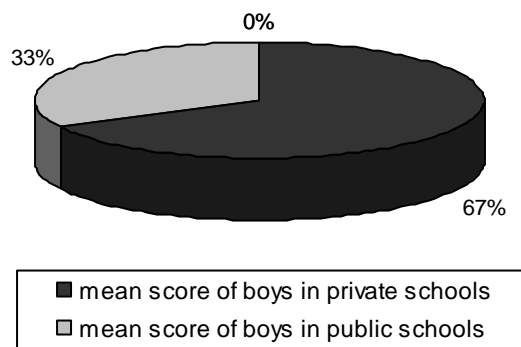
Group compared	Sample size	Mean	Standard deviation	Mean difference	z-cal.	z- cri.
Private school boys	35	87.05	10.77	44.37	11.50	1.645
Public school girls	25	42.68	19.18			

The above table shows that the mean mathematics scores of boys in private secondary schools and boys in public secondary schools are 87.05 and 42.68 respectively. Therefore, the mean achievement difference of boys in private secondary schools and boys in public secondary schools is 44.37. The standard deviation of mathematics achievement of boys in private secondary schools and

boys in public secondary schools are 10.77 and 19.18 respectively. The calculated z-value 11.50 by mean and standard deviation is greater than the tabulated z-value 1.645 at 0.05 level of significance. Hence, the mean achievement on compulsory mathematics of boys in private secondary schools is greater than the mean achievement on compulsory mathematics of boys in public secondary schools

Pie-chart 4.4

The mean scores of boys in private schools and boys in public schools



#### 4.5 Comparison of compulsory mathematics achievement of girls in private secondary schools and girls in public secondary schools

The researcher has analyzed the mathematics scores of 35 girls in private secondary schools and 25 girls in public secondary schools to compare the compulsory mathematics achievements of girls in private secondary schools and girls in public secondary schools. The mean, standard deviation and corresponding z-value of the score obtained by girls in private secondary schools and girls in public secondary schools have been presented in the table.

Table 4.5

The mean scores of girls in private schools and girls in public schools

Group compared	Sample size	Mean	Standard deviation	Mean difference	z-cal.	z- cri.
Private school girls	35	86.40	10.54	44.52	10.97	1.645
Public school girls	25	41.88	20.77			

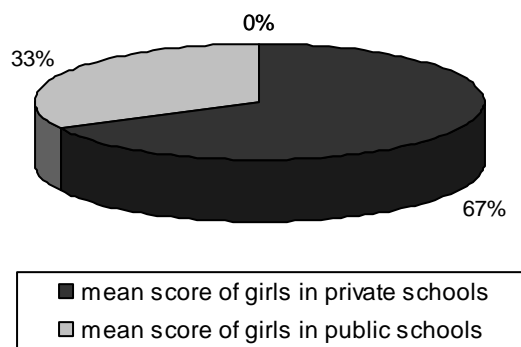
The above table shows that the mean mathematics scores of girls in private secondary schools and girls in public secondary schools are 86.40 and 41.88 respectively. Therefore, the mean



achievement difference of girls in private secondary schools and girls in public secondary schools is 44.52. The standard deviation of mathematics achievement of girls in private secondary schools and girls in public secondary schools are 10.54 and 20.77 respectively. The calculated z-value 10.97 by mean and standard deviation is greater than the tabulated z-value 1.645 at 0.05 level of significance. Hence, the mean achievement on compulsory mathematics of girls in private secondary schools is greater than the mean achievement on compulsory mathematics of girls in public secondary schools

Pie-chart 4.5

The mean scores of girls in private schools and girls in public school



#### 4.6 Comparison of compulsory mathematics achievement of boys and girls in private secondary schools

The researcher has analyzed the mathematics scores of 35 boys and 35 girls to compare the compulsory mathematics achievements of private secondary schools with respect to gender wise. The mean, standard deviation and corresponding z-value of the score obtained by boys and girls in private secondary schools have been presented in the following table.

Table 4.6

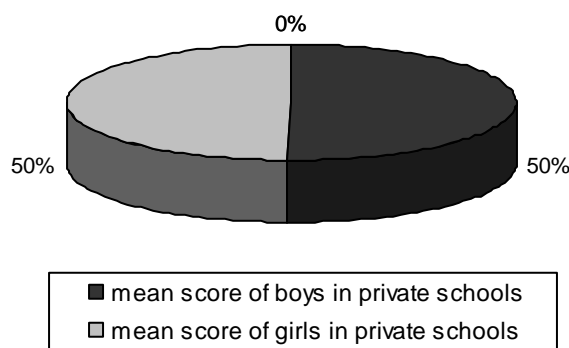
The mean scores of boys and girls in private schools

Group compared	Sample size	Mean	Standard deviation	Mean difference	z-cal.	z- cri.
Private school boys	35	87.05	10.77	0.65	0.25	1.645
Private school girls	35	86.40	10.54			

The above table shows that the mean mathematics scores of boys and girls in private secondary schools are 87.05 and 86.40 respectively. Therefore, the mean achievement difference of boys and girls in private secondary schools is 0.65. The standard deviation of mathematics achievement of boys and girls are 10.77 and 10.54 respectively. The calculated z-value 0.25 by mean and standard deviation is less than the tabulated z-value 1.645 at 0.05 level of significance. It indicates the mean achievement on compulsory mathematics of boys and girls in private secondary schools are similar. Hence, there is insignificant difference in the mean achievement on compulsory mathematics of boys and girls in private secondary schools.

Pie-chart 4.6

The mean scores of boys and girls in private schools



#### 4.7 Comparison of compulsory mathematics achievement of boys and girls in public secondary schools

The researcher has analyzed the mathematics scores of 25 boys and 25 girls to compare the compulsory mathematics achievements of public secondary schools with respect to gender wise. The mean, standard deviation and corresponding z-value of the score obtained by boys and girls in public secondary schools have been presented in the following table.

Table 4.7

The mean scores of boys and girls in public secondary schools

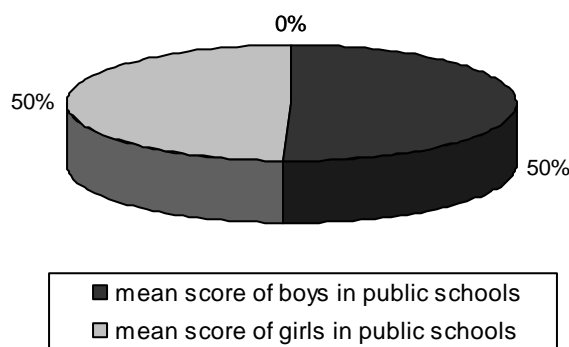
Group compared	Sample size	Mean	Standard deviation	Mean difference	z-cal.	z- cri.
Public school boys	25	42.68	19.18	0.8	0.14	1.645

Public school girls	25	41.88	20.77			
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The above table shows that the mean mathematics scores of boys and girls in public secondary schools are 42.68 and 41.88 respectively. Therefore, the mean achievement difference of boys and girls in public secondary schools is 0.8. The standard deviation of mathematics achievement of boys and girls are 19.18 and 20.77 respectively. The calculated z-value 0.14 by mean and standard deviation is less than the tabulated z-value 1.645 at 0.05 level of significance. It indicates, the mean achievement on compulsory mathematics of boys and girls in public secondary schools are similar. Hence, there is insignificant difference in the mean achievement on compulsory mathematics of boys and girls in public secondary schools.

Pie-chart 4.7

The mean scores of boys and girls in public schools



#### 4.8 Responses of secondary school mathematics teachers

All the items of Questionnaire for teachers presented to the 7 private secondary school mathematics teachers and 5 public secondary school mathematics teachers with their responses have been shown in the Appendix IV. The responses of the mathematics teachers which have been categorized in four groups.

1. Responses of private school mathematics teachers on physical facilities.
2. Responses of public school mathematics teachers on physical facilities.
3. Responses of private school mathematics teachers on mathematics teaching learning process.

4. Responses of public school mathematics teachers on mathematics teaching learning process.
- The responses of the mathematics teachers have been expressed in percentage table and bar diagram.

#### 4.8.1 The responses of the private school mathematics teachers on physical facilities

Table 4.8.1

Responses of private school mathematics teachers on physical facilities

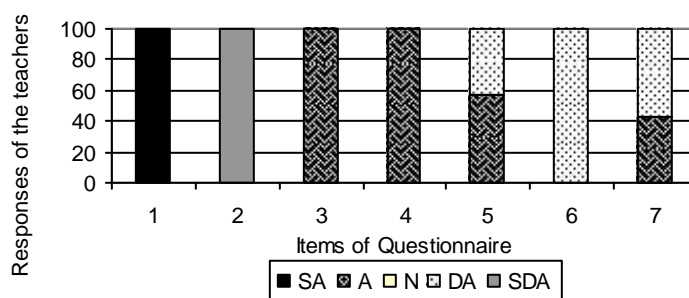
S.N.	STATEMENTS	SA %	A %	N %	DA %	SDA %
1	Surrounding of classroom is quite	100				
2	The mathematics classroom is quite					100
3	Furniture is adequate for the students		100			
4	The classroom is well lighted		100			
5	The size of blackboard is proper size		57		43	
6	Sound of outside the classroom disturbs the class.				100	
7	Mathematics library is available		43		57	

The responses of private secondary school mathematics teacher on Questionnaire related to physical facilities have been analyzed as follows:

The surrounding of the classroom is quite. The mathematics classroom is not crowded. Furniture is adequate for the students. The classroom is well lighted. The black board is proper size in many schools. Sound of outside the class room does not disturb the class. Mathematics library is not available in many schools.

Bar diagram 4.8.1

Responses of private school mathematics teachers on physical facilities



#### 4.8.2 The responses of the public school mathematics teachers on physical facilities

Table 4.8.2

Responses of public school mathematics teachers on physical facilities

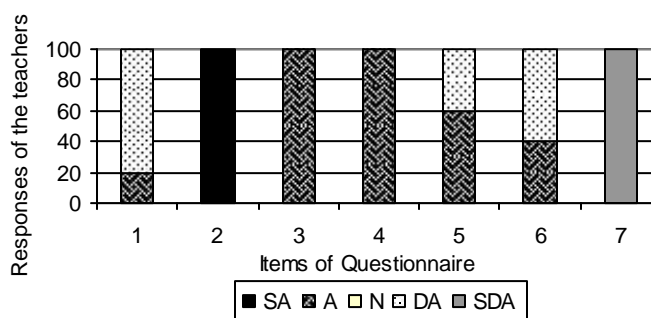
S.N.	STATEMENTS	SA %	A %	N %	DA %	SDA %
1	Surrounding of classroom is quite		20		80	
2	The mathematics classroom is quite	100				
3	Furniture is adequate for the students		100			
4	The classroom is well lighted		100			
5	The size of blackboard is proper size		60		40	
6	Sound of outside the classroom disturbs the class.		40		60	
7	Mathematics library is available					100

The responses of public secondary school mathematics teacher on Questionnaire related to physical facilities have been analyzed as follows:

The surrounding of the classroom is not quite. The mathematics classroom is crowded. Furniture is adequate for the students. The classroom is well lighted. The black board is proper size in many schools. Sound of outside the class room does disturb the class in many schools. Mathematics library is not available in all schools.

Bar diagram 4.8.2

Responses of public school mathematics teachers on physical facilities



#### 4.8.3 The responses of the private school mathematics teachers on mathematics teaching learning process.

Table 4.8.3

Responses of private school mathematics teachers on mathematics teaching learning process

	SA	A	N	DA	SDA

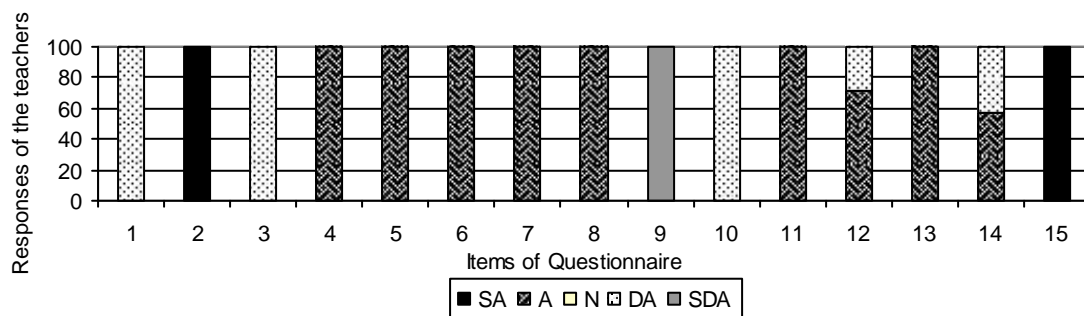
S.N.	STATEMENTS	%	%	%	%	%
1	I usually use lecture method.				100	
2	I am trained mathematics teacher.	100				
3	I frequently use teaching materials.				100	
4	I give daily mathematics homework.		100			
5	I conduct unit test of mathematics.		100			
6	I know the quality of each student in mathematics.		100			
7	I conduct special math program for weak students.		100			
8	I award students for the good performance.		100			
9	There is sexual biasness in mathematics teaching.					100
10	The students who are failed in maths are upgraded.				100	
11	Students are disciplined in the class.		100			
12	Students have required mathematics background.		71		29	
13	Students are regularly present in the class.		100			
14	Parents interact about their child progress.		57		43	
15	My school has strict management.	100				

The responses of private secondary school mathematics teacher on Questionnaire related to teaching learning process have been analyzed as follows:

The mathematics teachers are trained. They usually do not use lecture method. They frequently use teaching materials. They give daily homework. They conduct unit test and special mathematics program for weak students because they know the quality of each students. They award students for good performance. There is no sexual biasness in mathematics teaching. The students who are failed in mathematics are not upgraded. The school has strict management. So most of the students are disciplined and have required mathematics background. The students are regularly present in the class. Most of the parents interact about their child progress.

#### Bar diagram 4.8.3

Responses of private school mathematics teachers on mathematics teaching learning process



**4.8.4 The responses of the private school mathematics teachers on mathematics teaching learning process.**

Table 4.8.4

Responses of public school mathematics teachers on mathematics teaching learning process

S.N.	STATEMENTS	SA %	A %	N %	DA %	SDA %
1	I usually use lecture method.		100			
2	I am trained mathematics teacher.	100				
3	I frequently use teaching materials.				100	
4	I give daily mathematics homework.		100			
5	I conduct unit test of mathematics.		20		80	
6	I know the quality of each student in mathematics.				100	
7	I conduct special math program for weak students.				100	
8	I award students for the good performance.		100			
9	There is sexual biasness in mathematics teaching.					100
10	The students who are failed in maths are upgraded.	100				
11	Students are disciplined in the class.		40		60	
12	Students have required mathematics background.				20	80
13	Students are regularly present in the class.				100	
14	Parents interact about their child progress.				100	
15	My school has strict management.					100

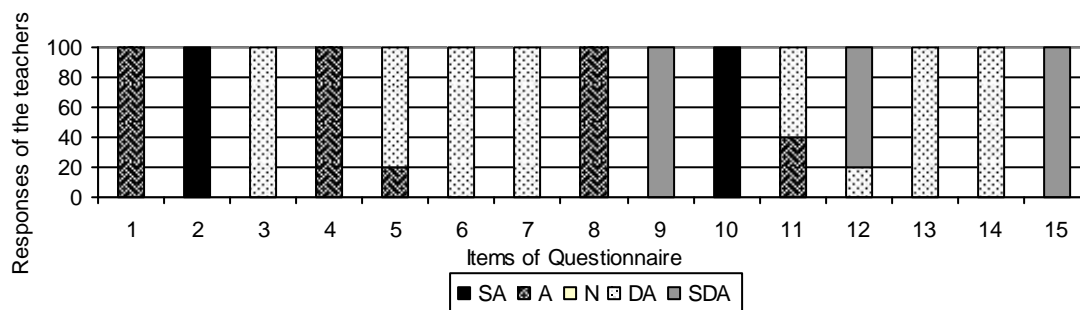
The responses of public secondary school mathematics teacher on Questionnaire related to teaching learning process have been analyzed as follows:

The mathematics teachers are trained but they use lecture method and frequently do not use teaching materials. They give daily homework. They do not conduct unit test and do not conduct special mathematics program for weak students. They award students for the good performance. There is no sexual biasness in mathematics teaching. The students who are failed in mathematics are upgraded. The schools do not have strict management. So most of the students are not disciplined

and have not required mathematics background. Students are not regularly present in the class. Parents do not interact about their child progress.

Bar diagram 4.8.4

Responses of public school mathematics teachers on mathematics teaching learning process



#### 4.9 Analysis of responses of the secondary school mathematics teachers

The researcher have been analyzed the responses mathematic teachers of private and public secondary school mathematics on Questionnaire related to physical facilities as follows:

1. Surrounding of classroom of private secondary schools is quite but surrounding of classroom of public secondary schools is not quite.
2. The mathematics classrooms of private secondary schools are not crowded but the mathematics classrooms of public secondary schools are very crowded.
3. Furniture is adequate in private secondary schools and in public schools.
4. Classroom of private schools and public secondary schools are lighted.
5. The size of blackboard is proper size in many private secondary school and many public secondary schools.
6. Sound of outside the classroom of private schools does not disturb the class but sound of outside the classroom of many public schools disturbs the class.
7. Some of the private secondary schools have mathematics library but the public secondary schools do not have mathematics library.



The responses of mathematic teachers of private and public secondary school mathematics on Questionnaire related to mathematics teaching learning process have been analyzed as follows:

1. The private secondary schools teacher usually do not use lecture method but the public secondary schools teacher usually use lecture method in mathematics teaching.
2. The mathematics teachers of private secondary schools and public secondary schools are trained.
3. The mathematics teachers of private secondary schools and public secondary schools frequently do not use teaching materials.
4. The mathematics teachers of private secondary schools and public secondary schools give daily mathematics homework
5. The private secondary school teachers conduct unit test of mathematics but the public secondary school teachers do not conduct unit test of mathematics.
6. The private secondary school teachers know the quality of each student in mathematics but the public secondary schools teachers do not know the quality of each student.
7. The private school teachers conduct special mathematics program for weak students but the public school teachers do not conduct special mathematics program.
8. The mathematics teachers of private and public secondary schools award students for the good performance.
9. There is no sexual biasness in mathematics teaching in private and public schools.
10. The private schools students who are failed in mathematics are not upgraded but the public school students who are failed in mathematics are upgraded.
11. The private school students are disciplined in the class but many public school students are not disciplined.
12. Many private secondary school students have required mathematics background but the public secondary school students do not have mathematics background.
13. The private secondary school students are regularly present in the class but the public secondary school students are not regularly present in the class.
14. The private school parents interact the teacher about their child progress but the public school parents do not interact the teacher about their child progress.

15. The private secondary schools have strict management but the public secondary schools do not have strict management.

## **CHAPTER V**

### **SUMMARY, FINDING, CONCLUSION, RECOMMENDATION**

The researcher has presented a brief re-statement of the problem, a description of the procedures used discussion of findings and conclusions of the study.

#### **5.1 Summary of the study**

Mathematics has been given an important place in the curricula of all levels of school education as well as plays a vital role individual's daily life. There are two types of secondary schools, i.e. private and public existing in Nepalese education system. At the end of secondary education, school leaving certificate examination is held. Parents evaluate the quality of school education in term of SLC results. Parents, who are aware of the importance of education, prefer sending their children to private schools rather than sending them to public schools because of the popularization of private schools in their quality education. For this region, the researcher conducted the comparative study on mathematics achievements of private and public school students in SLC examination and also with respect to gender wise in both types of schools.

The population for this study consisted of all secondary school students in Pokhara sub-metropolis for the academic year 2066. There are 92 private secondary schools and 20 public secondary schools. Out of which, 7 private secondary schools and 5 public secondary schools have been randomly selected as sample schools. Out of 10727 secondary school students, 120 students have been randomly chosen for the sample of the study. For each school, 10 students have been chosen where boys and girls have been chosen equal.

For this study, the secondary data has been taken from compulsory mathematics scores of students from randomly selected secondary schools of Pokhara sub-metropolis in the academic year 2066 and the primary data has been taken from the responses of the mathematics teachers.

The collected data of mathematics score of students have been analyzed by computing the mean, mean difference, standard deviation. The z-test has been applied to compare the mean scores of private and public secondary schools. The mean score of mathematics achievements of students have been presented in the table and Pie-chart. The mathematics teachers of corresponding sample schools have been requested to fill the Questionnaire. The responses of the mathematics teachers have been presented in percentage table and bar diagram.

## **5.2 Findings of the study**

The statistical analysis and interpretation of the collected data has yielded the following results as finding of this study.

1. The mean mathematics scores of private secondary school students is greater than the mean mathematics scores of public school secondary students.
2. The mean mathematics scores of boys in private secondary school is greater than the mean mathematics scores of girls in public secondary school.
3. The mean mathematics scores of girls in private secondary school is greater than the mean mathematics scores of boys in public secondary school.
4. The mean mathematics scores of boys in private secondary school is greater than the mean mathematics scores of boys in public secondary school.
5. The mean mathematics scores of girls in private secondary school is greater than the mean mathematics scores of girls in public secondary school.
6. The mean mathematics scores of boys and girls in private secondary school are same.
7. The mean mathematics scores of boys and girls in public secondary school are same.
8. The mathematics classroom of private secondary schools are not crowded but the mathematics classroom of public secondary schools are crowded.
9. The private secondary school teachers usually use lecture method but the public secondary school teachers do not usually use lecture method.
10. The public secondary school teacher does not conduct unit test and special mathematics program for weak students.
11. There is no sexual biasness in mathematics teaching in private and public schools.
12. The private school secondary school students who are failed in mathematics are upgraded but the public school school students who are failed in mathematics are not upgraded.

13. The private secondary school students are regularly present in the class but the public secondary school students are not regularly present in the class.
14. The private secondary school parents interact about their child progress but the public secondary school parents do not interact about their child progress.
15. The private secondary schools have strict management but the public secondary schools do not have strict management.

### **5.3 Conclusions of the study**

On the basis of findings of the study, some very significant conclusions which had been drawn by this study are listed here below:

1. The compulsory mathematics achievement of students in private secondary schools is greater than the compulsory mathematics achievement of students in public secondary schools.
2. The compulsory mathematics achievement of students with respect to gender wise are differ in different types of secondary schools.
3. The compulsory mathematics achievement of students with respect to gender wise are not differ in same type of secondary schools.
4. Schools should also have the incentives and qualified mathematics teachers to manage class properly for the better achievement on mathematics of students.
5. The compulsory mathematics achievement can be improved with attracting students to participate energetically and regularly in mathematics class as well as proper number of students in the class and special program for the weak students.
6. The students who are failed in mathematic should not be upgraded for the required mathematics background.
7. Parents' consciousness or awareness towards their children's education is a very important approach to improve students' achievement in mathematics.
8. The schools should have strict administration for the better achievement on compulsory mathematics of students.

### **5.4 Recommendations for the further study**

From the findings and conclusions of this study, the researcher would like to make the following recommendations:

1. This study was limited to Pokhara sub-metropolis, similar studies can be conducted to obtain broader and valid generalization for the district, region and nation.
2. A similar study can be done for primary, lower secondary and higher secondary level.
3. A similar study can be extended in other subject as well.
4. A study can be made for the improvement of the education of the children who could not afford the fees of private schools to have access to quality education.

## BIBLIOGRAPHY

Afolabi, A.O., *Essentials of educational technology: Oyo*, Kay Blessings Ventures, 2001.

Arena, A., *Comparative Performance of Day and Boarding Students in Secondary School Certificate Mathematics Examination: A Case Study of Kasena-Nankana and Asuogyman Districts of Ghana*, 2009

CERID, *Secondary Education and SLC Examination: An Employment Perspective*, A Study Report, T.U., Kathmandu, 1996.

Cowie, A.P., *Oxford Advanced Learner's Dictionary*, Fourth Edition; Delhi: Oxford University Press, 1991.

Datta, Bibhutibhusan and Singh, Avadesh Narayan, *History of Hindu Mathematics*, Bombay: Asia Publishing House, 1962.

Howard Eves, *An Introduction to the History of Mathematics* (fifth Edition), New York : CBS College Publishing 1983.

James/James, *Mathematics Dictionary* (Fourth Edition) 2000: CBS Publisher and Distributors.

*Kaski Shaichhik Darpan 2063*, District Education Office Kaski.

*Kaski Shaichhik Darpan 2066*, District Education Office Kaski.

Ministry of Education, *Education in Nepal*, Kathmandu, Bureau of Publication: College of Education of Nepal, Kathmandu 1956.

Ministry of Education, *School Observation*: Published by BPEP, 2053.

*National Education System Plan (1971-76)*: Ministry of Education 2028.

*NESP Mathematics Curriculum*, Kathmandu 2030.

Nepal Secondary Education Project, *Control and Management of Private Schools* : Department for International Development UK, 1998.

Pandey, Ganga Prasad, “ A Comparative Study of Teaching Activities and Achievement in Mathematics of the Pupils of public and private lower secondary schools of Birendra Nagar Municipality, Surkhet”, Master Thesis, Faculty of Education, T.U. 1999.

Pandit, Ramjee Prasad, *Ganit Sikshana*, Kathmandu : Indra Pandit, 1998.

Peirce, Charles Sanders, The Essence of Mathematics, *The World of Mathematics*, USA, 1988.

Pradhan, Ratna Man, *Performance Levels of Public and Private Privary Schools: A Comparative Study*, T.U. CERID, 1993

Poudel, L. N., *Instructional Process and Education in Nepal*: Bhanu Prints Publishing, Kathmandu, 2055.

Rajbansi, Laxman, *Yesterday and Today of Education*: Siddharth Banasthali Institution, 1999

*School Level Curriculum, Kathmandu: National Education Committee, 1985.*

*Secondary Education Curriculum (Compulsory Mathematics), Kathmandu: Ministry of Education and Sports, Curriculum Development Center, 2057.*

The International Commission of Mathematics Instruction (ICMI), *New Trend in Mathematics*, 1966, Vol. 5.

Thapa, Dil Bahadur, " A Comparative Study of Secondary Level Students Achievement in Mathematics between Private and Public School at Butwal Municipality of Rupandehi District", Master Thesis, Faculty of Education, T.U. 2005.

## APPENDICES

### Appendix I

Name and address of secondary schools in Pokhara sub-metropolis in the year 2066

Table I.1

S.N.	Name of private secondary schools	Address
1	Adarsha English Boarding School	Pokhara - 12
2	Alpha Boarding School	Pokhara -16
3	Amar Joyti Boarding School	Pokhara – 8
4	Anjuli English Boarding School	Pokhara – 1
5	Balbiddhya Mandir	Pokhara – 12
6	Balkalyan Boarding School	Pokhara – 13
7	Bal Prabhat Boarding School	Pokhara – 8
8	Balodaya English Boarding School	Pokhara – 17
9	Base Line Academy	Pokhara – 13
10	Bethani Higher Secondary School	Pokhara – 10
11	Bhanubhakta Boarding School	Pokhara – 1
12	Bhaskar Memorial Boarding School	Pokhara – 11
13	Biddhyaniketan Boarding School	Pokhara – 17
14	Bindhyashori Boarding School	Pokhara – 1
15	Children Academy	Pokhara – 13
16	Dainamic Academy	Pokhara – 8
17	Di. Wisodom Boarding School	Pokhara – 8
18	Ex Army Public School	Pokhara – 9
19	Fewa Boarding School	Pokhara – 17
20	Fishtail Acadeemy	Pokhara – 6
21	Gandaki Awasiya Higher Secondary School	Pokhara – 17
22	Global Colligate Higher Secondary School	Pokhara – 16
23	Golden Future Boarding School	Pokhara – 11

24	Gorkha Boarding School	Pokhara – 15
25	Green Valley Boarding School	Pokhara – 16
26	Gyankunja Boarding School	Pokhara – 12
27	Gyanubaba Higher Secondary School	Pokhara – 8
28	Hill Point Boarding School	Pokhara – 2
29	Himalayan Boarding School	Pokhara – 12
30	Himanchal Boarding School	Pokhara – 17
31	Jyotikunja Education Foundation	Pokhara – 8
32	Karunalidhi Education Foundation	Pokhara – 15
33	Kaski Mordanaijda Boarding School	Pokhara – 1
34	Kumudinihoms Higher Secondary School	Pokhara – 10
35	Laxmi Awashiya Higher Secondary School	Pokhara – 4
36	Litil Step Higher Secondary School	Pokhara -9
37	Litil Bels Boarding School	Pokhara – 8
38	Lotus Academy	Pokhara – 9
39	L.P. Devkota Memoriyal	Pokhara – 9
40	Maitri Children Academy	Pokhara – 17
41	Manakamana Boarding School	Pokhara – 8
42	Merigold Boarding School	Pokhara – 15

S.N.	Name of private secondary schools	Address
43	Metropolitan Academy	Pokhara – 10
44	Motherland Higher Secondary School	Pokhara – 7
45	Mount Annapurna Secondary School	Pokhara – 2
46	Mount Everest Boarding School	Pokhara – 8
47	National Inventive Boarding School	Pokhara – 6
48	Nawadip Boarding School	Pokhara – 5
49	New Galexii Boarding School	Pokhara – 3
50	New Milinium Academy	Pokhara – 17
51	New Model Awasiya Higher Secondary School	Pokhara – 8
52	Nilgiri Boarding School	Pokhara – 8
53	Oxford English Boarding School	Pokhara – 13
54	Paramount Public Secondary School	Pokhara – 10
55	Pascal Academy	Pokhara – 1
56	Pashimanchal Higher Secondary School	Pokhara – 4
57	Peacezone Academy	Pokhara – 8
58	Painiyar English Boarding School	Pokhara – 10
59	Pokhara Academy	Pokhara – 16
60	Pokhara Cambridge Secondary School	Pokhara – 6
61	Pokhara Criative English Boarding School	Pokhara – 8
62	Pokhara Academy	Pokhara – 4
63	Pokhara Kinder Gartan	Pokhara – 17
64	Pokhara Malti Model Higher Secondary School	Pokhara – 8
65	Pokhara Public Secondary School	Pokhara – 9
66	Pragati Boarding School	Pokhara – 16
67	Prativa Higher Secondary School	Pokhara – 3
68	Renbo Academy Home	Pokhara – 15
69	Sagarmatha Higher Secondary School	Pokhara – 9
70	Sentmerig Boarding School	Pokhara – 15
71	Sarada Boarding School	Pokhara – 3



72	Saraswati Boarding School	Pokhara – 8
73	Satyasai Biddhyashram	Pokhara – 3
74	Shantidip Boarding School	Pokhara – 17
75	Spiral Gyalexi Academy	Pokhara – 1
76	Seddharth Boarding School	Pokhara – 11
77	Shishukalyan Boarding School	Pokhara – 17
78	Shishu Niketan Higher Secondary School	Pokhara – 17
79	Social Public Secondary School	Pokhara – 10
80	S.O.S. Herman Mainar	Pokhara – 17
81	S.O.S. Higher Secondary School	Pokhara – 15
82	Srijana Higher Secondary School	Pokhara – 8
83	Step by Step Higher Secondary School	Pokhara – 7
84	Subakamana Secondary School	Pokhara – 6
85	Subline English Boarding School	Pokhara – 17
86	Sunflower English Boarding School	Pokhara – 17
87	Suryodaya Boarding School	Pokhara – 16
88	Tarapunja Boarding School	Pokhara – 13
89	Tarapunja Education Academy	Pokhara – 1
90	Tops English Boarding School	Pokhara – 10
91	View Point Boarding School	Pokhara – 15
92	West Point Boarding School	Pokhara – 11

Table II.2

Name and address of public secondary schools in Pokhara sub-metropolis in the year 2066

S.N.	Name of public secondary schools	Address
1	Amarsimha Higher Secondary School	Pokhara - 10
2	Bal Mandir Secondary School	Pokhara -3
3	Barahi Higher Secondary School	Pokhara – 17
4	Bhadrakali Higher Secondary School	Pokhara – 13
5	Bhindabasini Higher Secondary School	Pokhara – 2
6	Chhorepatan Higher Secondary School	Pokhara – 17
7	Janapriya Higher Secondary School	Pokhara – 8
8	Kalika Higher Secondary School	Pokhara – 10
9	Mahendra Higher Secondary School	Pokhara – 9
10	Nawin Higher Secondary School	Pokhara – 4
11	Nawa Prabhat Secondary School	Pokhara – 9

12	Pardi Secondary School	Pokhara – 17
13	Rameshori Secondary School	Pokhara – 14
14	Rastria Higher Secondary School	Pokhara – 1
15	Ratna Rajya Laxmi Secondary School	Pokhara – 3
16	Siddha Higher Secondary School	Pokhara – 15
17	Shivashakti Secondary School	Pokhara – 11
18	Sukraraj Balbhadra Secondary School	Pokhara – 18
19	Sanskrit Secondary School	Pokhara – 1
20	Tal Barahi Higher Secondary School	Pokhara – 6

## Appendix II

Table II.1

Sample private schools and compulsory mathematics score of sample students

Name of private secondary schools	Score of boys	Scores of girls
Balodaya English Boarding School, Pokhara - 17	96, 89, 91, 60, 71	79, 96, 85, 97, 64
Gandaki Higher Secondary B. School, Pokhara- 16	87, 98, 89, 97, 72	74, 92, 93, 97, 89
Global Collegiate School, Pokhara- 11	89, 62, 95, 87, 85	97, 98, 95, 94, 68
Hermann Gemeiner S. School, Pokhara- 15	95, 96, 67, 99, 90	93, 92, 66, 87, 93
Kaski Modernized Academy, Pokhara- 10	87, 82, 94, 88, 92	83, 91, 98, 78, 92
Motherland Higher Secondary School, Pokhara- 7	81, 97, 96, 99, 88	97, 93, 86, 75, 68
Nilgiri English Boarding School, Pokhara- 8	67, 98, 78, 91, 94	77, 86, 94, 65, 92

Table II.2

Sample public schools and compulsory mathematics score of sample students

Name of public secondary schools	Score of boys	Scores of girls
Bindhabasini H.S. School, Pokhara- 2	49, 67, 34, 50, 23	40, 23, 73, 55, 36
Bhadrakali Higher Secondary School, Pokhara- 13	89, 53, 20, 45, 51	86, 49, 42, 36, 58
Mahendra Higher Secondary School, Pokhara- 9	27, 46, 15, 18, 45	43, 20, 24, 15, 11
Sukraraj Balbhadra Secondary School, Pokhara- 18	37, 32, 16, 74, 39	62, 27, 44, 32, 89
Tal Barahi Secondary School, Pokhara- 6	62, 71, 23, 32, 49	18, 52, 19, 17, 50

Table II.3

The mean scores and standard deviation of students in private schools and public schools

Group of students	Mean scores	Standard deviation
Private secondary school students	86.73	10.66
Public secondary school students	41.76	20.17
Boys in private secondary schools	87.05	10.77
Girls in private secondary schools	86.40	10.54
Boys in public secondary schools	42.68	19.18
Girls in public secondary schools	41.88	20.77

### Appendix III

#### Calculation of z-value

Statistic used in this study given as follows:

$$z = \frac{\bar{x}_1 - \bar{x}_2}{s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \quad \text{Where} \quad s_p = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}$$

1. Statistic used in the scores of students in private and public secondary schools.

Number of private secondary school students ( $n_1$ ) = 70

Number of public secondary school students ( $n_2$ ) = 50

Mean scores of private secondary school students ( $\bar{x}_1$ ) = 86.73

Mean scores of public secondary school students ( $\bar{x}_2$ ) = 41.76

Standard deviation of the scores of private secondary school students ( $s_1$ ) = 10.66

Standard deviation of the scores of public secondary school students ( $s_2$ ) = 20.17

The calculated z-value = 15.45, The tabulated  $z_{0.05} = 1.645$

2. Statistic used in the scores of boys in private schools and girls in public schools:

Number of boys in private secondary schools ( $n_1$ ) = 35

Number of girls in public secondary schools ( $n_2$ ) = 25

Mean scores of boys in private secondary schools ( $\bar{x}_1$ ) = 87.05

Mean scores of girls in public secondary schools ( $\bar{x}_2$ ) = 41.88

Standard deviation of the scores of boys in private secondary schools ( $s_1$ ) = 10.77

Standard deviation of the scores of girls in public secondary schools ( $s_2$ ) = 20.77

The calculated z-value = 11.07, The tabulated  $z_{0.05} = 1.645$

3. Statistic used in the scores of girls in private schools and boys in public schools:

Number of girls in private secondary schools ( $n_1$ ) = 35

Number of boys in public secondary schools ( $n_2$ ) = 25

Mean scores of girls in private secondary schools ( $\bar{x}_1$ ) = 86.40

Mean scores of boys in public secondary schools ( $\bar{x}_2$ ) = 42.68

Standard deviation of the scores of girls in private secondary schools ( $s_1$ ) = 10.54

Standard deviation of the scores of boys in public secondary schools ( $s_2$ ) = 19.18

The calculated z-value = 11.42, The tabulated  $z_{0.05} = 1.645$

4. Statistic used in the scores of boys in private schools and boys in public schools:

Number of boys in private secondary schools ( $n_1$ ) = 35

Number of boys in public secondary schools ( $n_2$ ) = 25

Mean scores of boys in private secondary schools ( $\bar{x}_1$ ) = 87.05

Mean scores of boys in public secondary schools ( $\bar{x}_2$ ) = 42.68

Standard deviation of the scores of boys in private secondary schools ( $s_1$ ) = 10.77

Standard deviation of the scores of boys in public secondary schools ( $s_2$ ) = 19.18

The calculated z-value = 11.50, The tabulated  $z_{0.05} = 1.645$

5. Statistic used in the scores of girls in private schools and girls in public schools:

Number of girls in private secondary schools ( $n_1$ ) = 35

Number of girls in public secondary schools ( $n_2$ ) = 25

Mean scores of girls in private secondary schools ( $\bar{x}_1$ ) = 86.40

Mean scores of girls in public secondary schools ( $\bar{x}_2$ ) = 41.88

Standard deviation of the scores of girls in private secondary schools ( $s_1$ ) = 10.54

Standard deviation of the scores of girls in public secondary schools ( $s_2$ ) = 20.77

The calculated z-value = 10.97, The tabulated  $z_{0.05} = 1.645$

6. Statistic used in the scores of boys and girls in private secondary schools.

Number of boys in private secondary schools ( $n_1$ ) = 35

Number of girls in private secondary schools ( $n_2$ ) = 35

Mean scores of boys in private secondary schools ( $\bar{x}_1$ ) = 87.05

Mean scores of girls in private secondary schools ( $\bar{x}_2$ ) = 86.40

Standard deviation of the scores of boys in private secondary schools ( $s_1$ ) = 10.77

Standard deviation of the scores of public secondary school students ( $s_2$ ) = 10.54

The calculated z-value = 0.25, The tabulated  $z_{0.05} = 1.645$

7. Statistic used in the scores of boys and girls in public secondary schools.

Number of boys in public secondary schools ( $n_1$ ) = 25

Number of girls in public secondary schools ( $n_2$ ) = 25

Mean scores of boys in public secondary schools ( $\bar{x}_1$ ) = 42.68

Mean scores of girls in public secondary schools ( $\bar{x}_2$ ) = 41.88

Standard deviation of the scores of boys in public secondary schools ( $s_1$ ) = 19.18

Standard deviation of the scores of girls in public secondary schools ( $s_2$ ) = 20.77

The calculated z-value = 0.14, The tabulated  $z_{0.05} = 1.645$

## Appendix IV

### Responses of secondary school mathematics teachers

Table IV.1

Responses of seven private secondary school mathematics teachers

S.N.	STATEMENTS	SA	A	N	DA	SDA
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I	Questionnaire related to physical facilities in your school.					
1	Surrounding of classroom is quite	7				
2	The mathematics classroom is crowded.					7
3	Furniture is adequate for the students.		7			
4	The classroom is well lighted.		7			
5	The size of blackboard is proper size.		4		3	
6	Sound of outside the classroom disturbs the class.				7	
7	Mathematics library is available.		3		4	
II	Questionnaire related to mathematics teaching learning process in your school.					
1	I usually use lecture method.				7	
2	I am trained mathematics teacher.	7				
3	I frequently use teaching materials.				7	
4	I give daily mathematics homework.		7			
5	I conduct unit test of mathematics.		7			
6	I know the quality of each student in mathematics.		7			
7	I conduct special math program for weak students.		7			
8	I award students for the good performance.		7			
9	There is sexual biasness in mathematics teaching.					7
10	The students who are failed in maths are upgraded.				7	
11	Students are disciplined in the class.		7			
12	Students have required mathematics background.		5		2	
13	Students are regularly present in the class.		7			
14	Parents interact about their child progress.		4		3	
15	My school has strict management.	7				

Note: Strongly Agree: SA, Agree: A, Neutral: N, Disagree: DA, Strongly Disagree: SDA.

Table IV.2

Responses of five public secondary school mathematics teachers

S.N.	STATEMENTS	SA	A	N	DA	SDA
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I	Questionnaire related to physical facilities in your school.					
1	Surrounding of classroom is quite		1		4	
2	The mathematics classroom is crowded.	5				
3	Furniture is adequate for the students.		5			
4	The classroom is well lighted.		5			
5	The size of blackboard is proper size.		3		2	
6	Sound of outside the classroom disturbs the class.		2		3	
7	Mathematics library is available.					5
II	Questionnaire related to mathematics teaching learning process in your school.					
1	I usually use lecture method.		5			
2	I am trained mathematics teacher.	5				
3	I frequently use teaching materials.				5	
4	I give daily mathematics homework.		5			
5	I conduct unit test of mathematics.		1		4	
6	I know the quality of each student in mathematics.				5	
7	I conduct special math program for weak students.				5	
8	I award students for the good performance.		5			
9	There is sexual biasness in mathematics teaching.					5
10	The students who are failed in maths are upgraded.	5				
11	Students are disciplined in the class.		2		3	
12	Students have required mathematics background.				1	4
13	Students are regularly present in the class.				5	
14	Parents interact about their child progress.				5	
15	My school has strict management.					5

Note: Strongly Agree: SA, Agree: A, Neutral: N, Disagree: DA, Strongly Disagree: SDA.