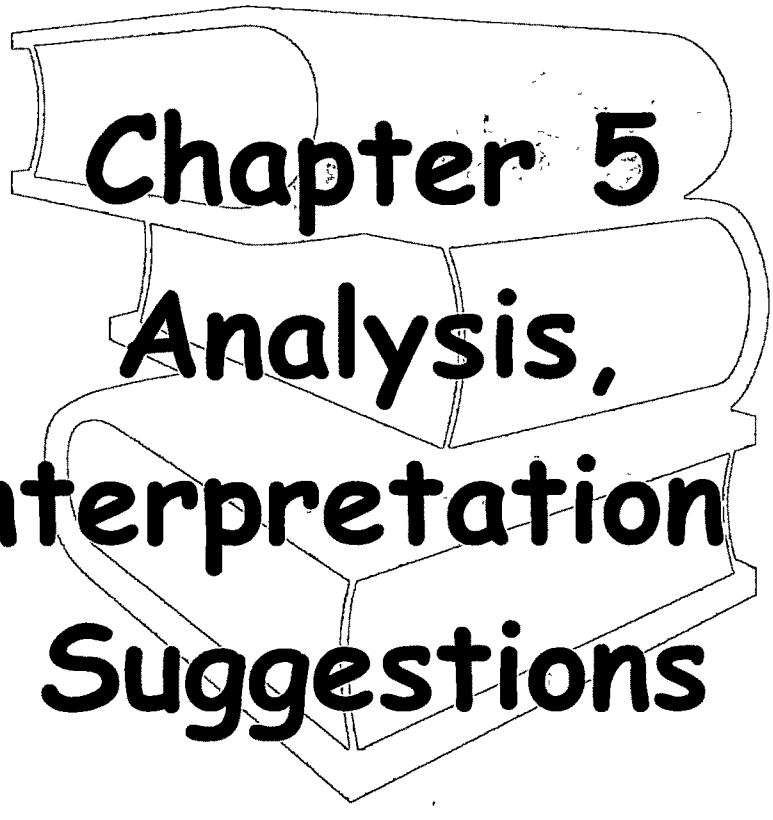


Chapter 5
Analysis, Interpretation & Suggestions

CHAPTER – V

ANALYSIS, INTERPRETATION AND SUGGESTIONS

5.1 INTRODUCTION

In this chapter, the investigator has discussed the findings based on situation analysis, which the investigator derived through analyzing the questionnaires of students, teachers and parents as well as the information schedule. Causes of low achievement in mathematics have also been discussed. Problems in teaching learning in mathematics have also been discussed. The investigator has made error analysis and discussed regarding the major errors made by the students in various tests administered by the investigator. Mean of each test as well as comparison of mean marks of class IX (pre–test), pilot test and final achievement test (post–test) have also been discussed. Lastly the investigator has presented the individual graphs of all the students and calculation of 't' for finding the effectiveness of the programme. The investigator has made suggestions for students, teachers and parents to enhance the achievement of students in mathematics. Suggestions have also been listed down for further study.

5.2 FINDINGS BASED ON SITUATION ANALYSIS

The investigator has collected data through the information schedule as well as through questionnaires. Major findings based on situation analysis were as under:

- Low achiever students were identified on the basis of their marks in the subject Mathematics in the class IX annual examination. Analysis showed that out of sixty students who completed the whole programme eight students (thirteen percent) scored from twenty one to thirty, twenty two students (thirty seven percent) scored from thirty one to forty and thirty (fifty percent) students scored from forty one to fifty. Mean marks was 39.17.
- Ninety three percent students responded that they liked the subject mathematics. The reasons for liking of Mathematics were – full marks can be obtained in Mathematics (seventy eight percent), mathematics is the subject of calculation so the system of cramming is less and sums can be solved easily, mathematics is a subject which is very useful to get success in future, if Mathematics is understood, it is great pleasure to solve sums. Sums in some chapters are easy to do so it creates interest in doing the

sums, and mathematics is very useful in other subjects and in day to day life.

- Sixty six percent students opined that they find it difficult to learn mathematics. Ninety one percent felt difficulty while learning mathematics in classroom. Difficulties were of following type – lack of concentration due to weak base, frequent transfer of teachers in the class, the method of explanation differs from teacher to teacher, speedy teaching, less practice in geometry, lack of proper guidance regarding preparation of the subject and less use of black board by the teachers.
- Geometry was most difficult for students (fifty eight percent) while algebra and statistics were equally difficult (about seventy three percent).
- About forty one percent students liked teachers of mathematics. Major reasons of liking of teachers were – teacher use maxim of easy to difficult while teaching, teacher never gets angry, and teachers clarify the previous knowledge needed for that chapter.
- About fifty nine percent students did not like the teaching method of their teachers. Majority reasons for this were – teacher cannot make teaching interesting, teacher explains very quickly, teacher does not provide sufficient practice in the classroom, teacher does not explain the topic on the black–board.
- Fifty three percent students told that their teacher did not gave attention towards their mistakes in calculation.
- Fifty one percent students told that they are not participating in discussion in the classroom and forty three percent responded that they are not asking questions to their teachers if they don't understand any topic.
- Forty three percent students do not concentrate in the classroom and fifty one percent students felt boring in the period of mathematics. Fifty one percent students responded that higher strength of students in class created problems in the classroom in learning mathematics while ninety one percent students felt that additional coaching is needed for the weak students.
- Sixty seven percent students felt that teachers gave more homework.

- Fifty three percent students responded that their teachers did not check their homework.
- Forty one students responded that their teacher did not provide guidance about the homework given and forty eight percent students told that teacher does not draw any attention to the errors committed.
- Students' responses regarding the questions related to examination showed tension and fear of mathematics.
- According to the students the reasons for failure were – disliking of the subject, lack of sufficient time for preparation, concepts were not understood and some of them were not studied well, while some students faced the language problem.
- Sixty five percent students opined that more practice was required; thirty five students opined that slow teaching helped them to learn better while thirty percent students opined that more and more time for practice helped them. Ninety six percent students opined that practice of necessary prerequisite helped them.
- Fifty one percent students opined that seven or more periods per week should be conducted. Forty three percent students opined that frequent revision and more practice helped them.
- Forty seven percent students opined that they lost their marks in definitions and in fill in the gaps while seventy percent students lost their marks in theorems, riders and constructions. Sixty one percent students opined that their handwriting also caused for not getting good marks. Forty one percent students opined that they did not cultivate good method of writing paper. Eighty seven percent students confessed that they could not recall and remember the things prepared. Sixty nine percent students opined that less practice of writing question paper at home was the cause of less marks in mathematics. Seventy nine percent students opined that less time was contributed for the subject was the reason of less marks. Fifty one percent students opined that they did not get good marks because teacher of mathematics was not good. Forty four students confessed that the subject is tough therefore confidence is not developed while fifty one percent students opined that they did not know how to prepare the subject.

- Majority of the students opined following aspects were important to enhance the performance in mathematics – pattern of writing answer book, requirement to improve handwriting, to enhance concentration, recalling method, revision planning, goal setting, mini nap for relaxation, positive thinking, removing examination fear, hearing skill, speedy reading, writing and calculation, time management, how to study on the examination day, planning of three hours of examination, preparation of charts for important topics, examination tips, formation of good study habits.
- Seventy six percent parents responded that their child study mathematics regularly. Seventy six percent parents responded that they knew their child felt difficulty in mathematics.
- Forty seven percent parents were unable to help. The reasons for not helping their child were as follows: there was a vast difference in the subject now and that they have studied, job of both the parents and joint family, the child was not ready to take help of parents.
- Twenty four percent parents never discussed anything with Mathematics teacher about their child's study.
- The parents responded that their child did not sleep well on the day of examination, remained under tension till the paper was over, gets irritated during the examination and sometimes gets depressed before and after examination. It clearly indicated that their child had examination fear.
- According to average students the subject is most difficult. As a result one feels inferiority complex and have negative attitude towards mathematics. While teaching mathematics to the average students the teacher found following difficulties. The students were weak in basic like LCM, factorization, expansion, square root, cube root, square.
- According to majority of teachers following type of help is needed to weak students who experienced difficulty in mathematics – providing additional help as and when needed, revision of each chapter, conducting unit test, providing remedial measures.
- In response to availability of time for teaching of mathematics following reasons were shown by the teachers: though the time is sufficient to complete the syllabus, but not sufficient time for revision. Teachers felt that

thirty to thirty five minutes were not sufficient to teach theorems in geometry.

- In response to the teaching method followed, following were the suggestions: to test pre–knowledge was essential, frequent and more revision makes subject interesting, frequent unit tests for creating confidence, more practice in the classroom and group discussion and participation of the students makes the teaching interesting.
- Seventy six percent of teachers test the prerequisite knowledge for particular chapter not in a very planned manner, simply few questions were put before the class, while other teachers felt that no time is available for testing previous knowledge. Forty eight percent teachers responded that they conduct test in the school after finishing the chapter while fifty two percent teachers said that they did not take test in the school after finishing the chapter. The reasons for not taking the test was lack of sufficient time, more administrative work was allotted to them and students are not ready to give the test.
- All teachers responded that if the test was held after teaching each chapter and mistakes were corrected, definitely it was beneficial to the students who were getting fifty or less than fifty.
- Situation analysis clearly indicated that students are weak in basics and are not in clear prerequisite, teaching learning needs to be interesting. Motivation must be provided and study habits are needed to be cultivated.

5.2.1 Causes of Low Achievement

Major causes for low achievement according to the students in mathematics were – learning difficulty in classroom teaching, difficulty in geometry and statistics, teachers speedy teaching, insufficient time for teaching and learning of Mathematics in time–table, inability to solve homework without other's help, examination fear for the subject mathematics, examination stress, inability to remember due to stress in the examination hall, lack of basic concepts which become a potential cause of difficulty in learning higher concepts, lack of concentration and attention at the time of learning, lack of repetition, insufficient time provided by the teacher to solve

the examples in the classroom, problems in understanding theorems, riders, constructions, etc., difficulty in chapters like factors, height and distance, area, volume, rational expressions, insufficient practice, lack of positive attitude for Mathematics, insufficient care for weak students by the teacher, lack of revision at the end of the year, negative attitude towards subject Mathematics, lack of inspiration from teachers and parents, lengthy syllabus, lack of proper speed in calculating sums, slow recalling, difficulty in objective type questions of Mathematics like definitions and fill in the blanks, lack of knowledge regarding how to prepare Mathematics, lack of good study habits, were major causes for low achievement.

According to parents, in mathematics – Confusion and difficulty in studying Mathematics at home, laziness in doing homework of Mathematics, lack of interest for Mathematics, confusion at the time of solving the examples at home and in the examination hall, parents were unable to help the students in the subject Mathematics, lack of guidance on the part of teachers for Mathematics, negative attitude of the child towards the subject Mathematics, were the major causes for low achievement.

Major causes for low achievement of the students in subject Mathematics according to the teachers – Dislike for the subject of Mathematics from the beginning, negative attitude of the students towards Mathematics, inferiority complex that Mathematics will not be understood, lack of enough practice, less attention to weak students in Mathematics, lack of explaining figures in geometry, theorems, definitions, students prepare riders without understanding the figures, lethargy in basic concepts like multiplication, division, square root, cube root, square, cube, canceling numbers in numerator and denominator, the attitude of scoring minimum marks to pass the examination.

5.3 FINDINGS BASED ON PREREQUISITE TEST AND UNIT TEST

In the chapter four under development and implementation of programme prerequisite tests and unit tests for nineteen chapters of class X were administered. Calculated mean for prerequisite and unit tests are mentioned as under in table 101.

Table – 101:

Mean of Prerequisite and Unit Tests

Ch. No.	Name of the Chapter	Prerequisite Test		Unit Test	
		Marks	Mean	Marks	Mean
1	Functions	20	6.36	20	7.43
2	Rational Expressions	30	9.36	28	8.93
3	Cyclic Expressions	20	5.54	38	12.87
4	Ratio and Proportion	15	8.29	20	8.93
5	Variation	20	8.21	20	7.71
6	Quadratic Equations	30	10.29	20	8.42
7	Trigonometry	25	16.43	20	10.93
8	Height and Distances	15	8.07	15	6.61
9	Statistics	25	11.5	20	12.07
10	Computing	6	3.21	10	7.14
11	Similar Triangles	20	10.64	20	7.64
12	Conditions of Similarity	17	5.56	20	8.43
13	Similarity and Pythagoras Theorem	15	4.83	20	7.34
14	Circle and Chord	12	6.48	15	6.67
15	Arc of a Circle	10	4.79	15	4.69
16	Circle and its Tangent	10	4.07	15	5.09
17	Construction	8	3.74	10	3.31
18	Area	10	3.69	15	6.03
19	Volume	12	3.65	15	5.40

Mean of prerequisite tests showed poor performance of the students for prerequisite knowledge of previous standards. Performance of unit tests in respect of mean showed that teaching learning through developed programme enhanced their achievement to some extent. Counselling programme also reduced their teaching learning hurdles and enhanced their confidence and interest. Error analysis as well as remedial measures also helped the students to enhance their achievement to some extent.

5.4 MAJOR ERRORS COMMITTED BY STUDENTS IN VARIOUS TESTS

- Students could not find values of powers and indices due to insufficient knowledge and were not able to write values of trigonometric functions due to confusion between values.
- Students could not find range of logarithmic function due to insufficient knowledge of rules of logarithm.
- Students found it difficult to find values involving surds due to insufficient knowledge of their operations.
- The students could not find LCM of algebraic expression due to lack of clarity between HCF and LCM.
- Students were unable to solve examples as were lacking in knowledge of multiplication and division in subjects like factors expansion, height and distance, theorems and particularly in statistics.
- The students could not factorize due to insufficient knowledge of recognition of method to be applied particularly.
- The students could not simplify simple rational expressions due to inability to express them with some denominators.
- The students could not simplify due to their inability to cancel factors in same numerator and denominator in addition or subtraction and also in multiplication and division to invert expression in the topic rational expressions.
- The students could not factorize cyclic expressions due to inability to make proper groupings, to expand – inability to use proper formula and to recognition different types of factors.

- The students could not find simple ratio due to inability to cancel common numbers in numerator and denominator, were not able to find proper value of square root involving algebraic expression due to insufficient knowledge of powers and indices and also could not take common from bracket with perfect square due to inability to square and take common.
- The students could not find proper value due to inability to apply proper properties of proportion and were not able to simplify using powers and indices.
- The students could not factorize quadratic expression due to inability to recognize proper method and were not able to expand middle term due to not having proper confidence of finding it by doing multiplication.
- Students could not write the formula of perimeter and area of a rectangle and also could not find the area of right angled triangle due to lack of knowledge that one of the two sides making right angle is base and another is altitude and also were not able to convert equations and equal value roots as due to lack of knowledge.
- The students could not fill in the blanks due to improper knowledge of different trigonometric ratios and relation between them and were not able to answer sums involving fractions due to lack of knowledge of simplifying fractions, squaring quadratic surds, complementary angle and supplementary angle.
- The students could not solve the problems on height and distance due to inability to understand the problem and were not able to draw figures in a correct way and also were not able to use sin, tan, cos, etc. in a proper way.
- In finding mean, the students were not clear about how to form tables? What is required in the table? What should be taken as assumed mean? e.g. In finding mean, table requires class, frequency, mid value.
- In finding median, the students could not find cumulative frequency due to insufficient knowledge of cumulative frequency due to inability to find median class.
- The students could not write all steps of theorem properly due to insufficient basic knowledge of geometry like theorems and postulates

taught in previous standards 8 and 9. Students could not attempt riders as were lacking in knowledge, understanding problem in concepts of medians, congruent and similar triangles, equilateral triangles, alternate angles, corresponding angles, interior angles, vertically opposite angles, different points of concurrence, area i.e. centroid, isosceles triangle and parallel lines or basic proportion theorem.

- The concepts of chord, diameter, their relation, radius, were not clear to the students. The different properties of chord and circle application of Pythagoras were not clear, so the students could not calculate length of chord or diameter or distance between chords. Expression of circle in set language was not clear due to lack of understanding of what is a circle?
- The students find it difficult to apply Pythagoras theorem to evaluate one side when the other two sides of a right angled triangle are given.
- The properties of arc and relation with angles were not clear, so they could not give proper measure of an angle inscribed in a semicircle and were unable to write theorem on semicircle because the fundamentals were not clear like line segment joining the midpoints of two sides of a triangle is parallel to the third and transversal of parallel lines form congruent corresponding angles.
- The students had no clear concept of tangent and properties of chord so they were unable to find length of chord touching inner concentric circle. The concept of cyclic quadrilateral and the property – opposite angles of a cyclic quadrilateral and supplementary were also not clear.

5.5 COMPARISON OF ACHIEVEMENT

Table 102 presents the comparative Analysis of Marks in Pre–Test of Class IX and the Pilot Test and the Post–Test (Final Achievement Test) of Class X

Table – 102:

Comparative Analysis of Pre–Test, Pilot Test and Post–Test

Class (Marks)	No. of Students in Class IX (Pre–Test)	No. of Students in Pilot Test	No. of Students in Final Achievement Test (Post–Test)
1 – 10	–	–	–
11 – 20	–	1	–
21 – 30	8	5	–
31 – 40	22	12	4
41 – 50	30	11	6
51 – 60	–	14	15
61 – 70	–	10	24
71 – 80	–	5	8
81 – 90	–	2	3
91 – 100	–	–	–
	60	60	60
Mean	**39.17**	**50.83**	**61.33**

Table 102 shows the comparison of mean achievement from pre–test to pilot test and to post–test.

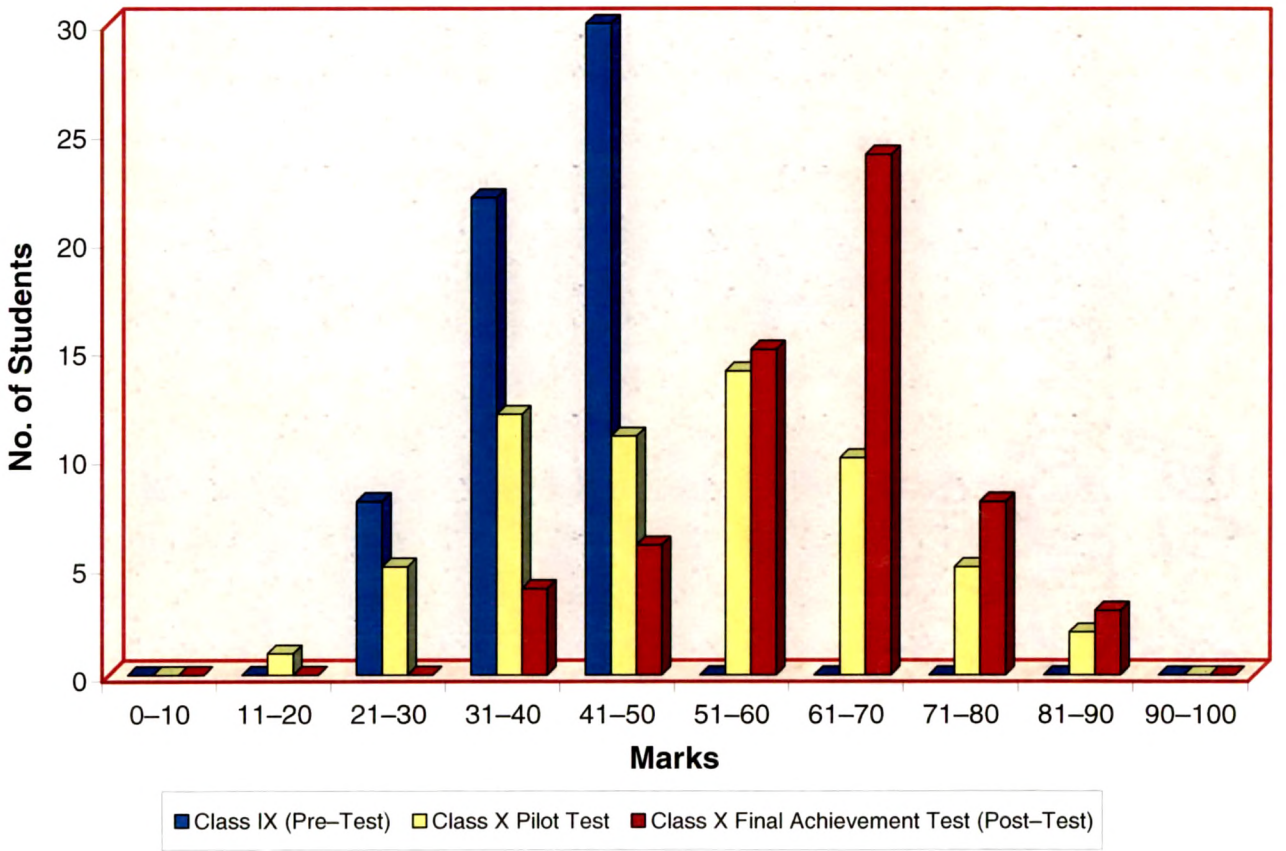
(1) The performance of the students has increased from mean of 39.17 in class IX (pre–test) to mean of 50.83 in Pilot Test. Thus, there is observed difference of 11.66.

(2) The mean achievement of pre–test (Class IX) was 39.17 and that of post–test (Final achievement test of class X) was 61.33. Thus, there is observed difference of 22.16.

Same has been presented graphically in figure 1.

Figure – 1:

Comparative Analysis of Marks of Pre–Test of Class IX and Marks of Pilot Test and Post–Test of Class X



5.6 INDIVIDUAL ACHIEVEMENT OF ALL THE STUDENTS

Here figures are presented for the sixty students who had completed the whole programme. Figures present student–wise achievement in Pre–Test (Class IX) and Post–Test (Final Achievement Test of Class X), and also shows aggregate increase in marks from Pre–Test to Post–Test.

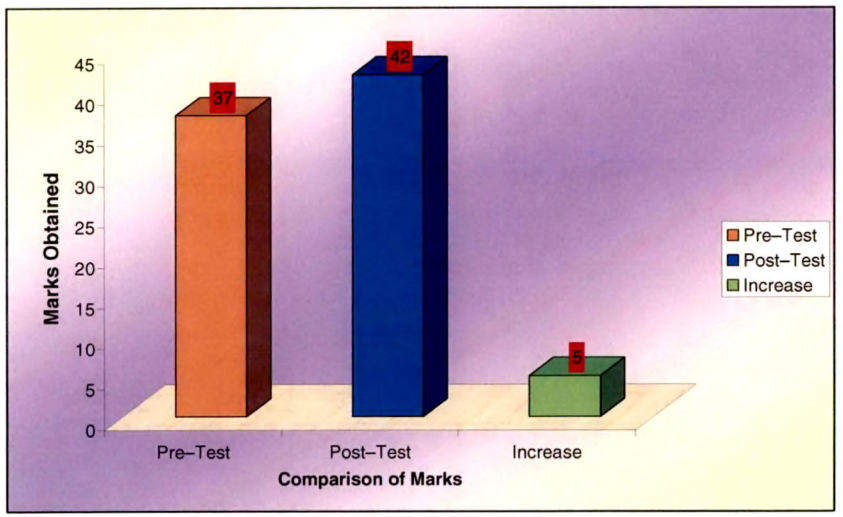
Roll No.	Name	School Name
2	Parekh Palak D.	Bright School

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	42
Marks of Class IX (Pre–Test)	37
Aggregate Increase in Marks	5

Figure – 2:

Individual Achievement of Roll No. 2 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **five** marks after implementation of the programme.

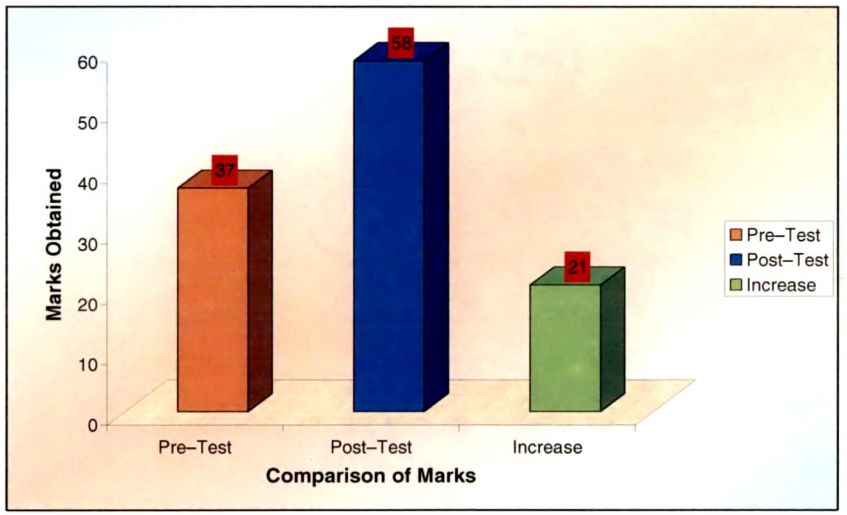
Roll No.	Name	School Name
3	Patel Priyank J.	Bright School

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	58
Marks of Class IX (Pre–Test)	37
Aggregate Increase in Marks	21

Figure – 3:

Individual Achievement of Roll No. 3 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twenty one** marks after implementation of the programme.

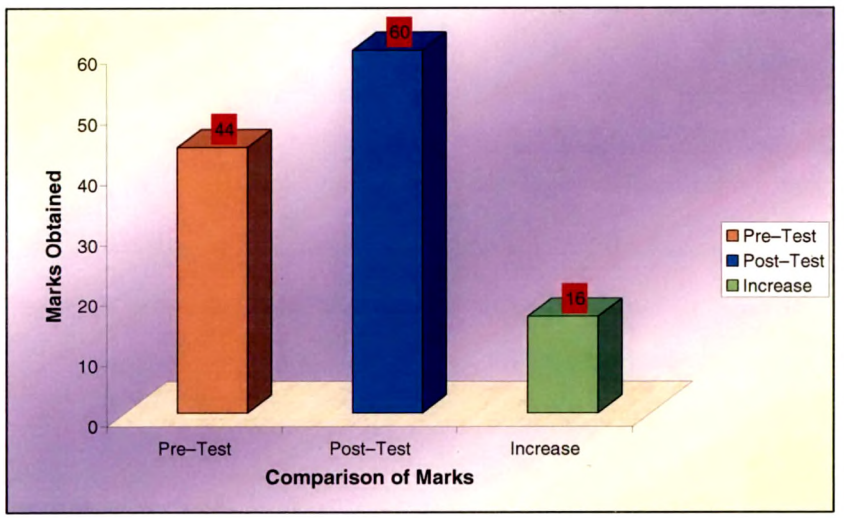
Roll No.	Name	School Name
4	Patel Pradeep V.	Bright School

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	60
Marks of Class IX (Pre–Test)	44
Aggregate Increase in Marks	16

Figure – 4:

Individual Achievement of Roll No. 4 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **sixteen** marks after implementation of the programme.

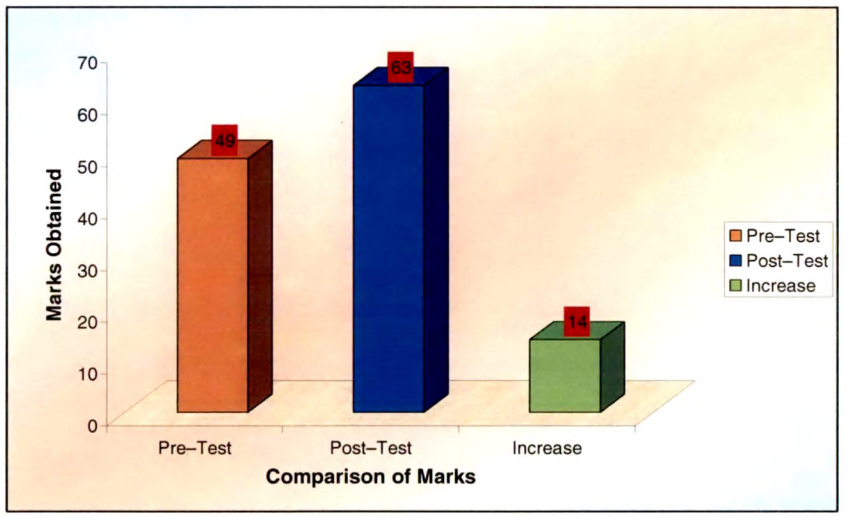
Roll No.	Name	School Name
5	Patel Mayur J.	Bright School

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	63
Marks of Class IX (Pre–Test)	49
Aggregate Increase in Marks	14

Figure – 5:

Individual Achievement of Roll No. 5 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **fourteen** marks after implementation of the programme.

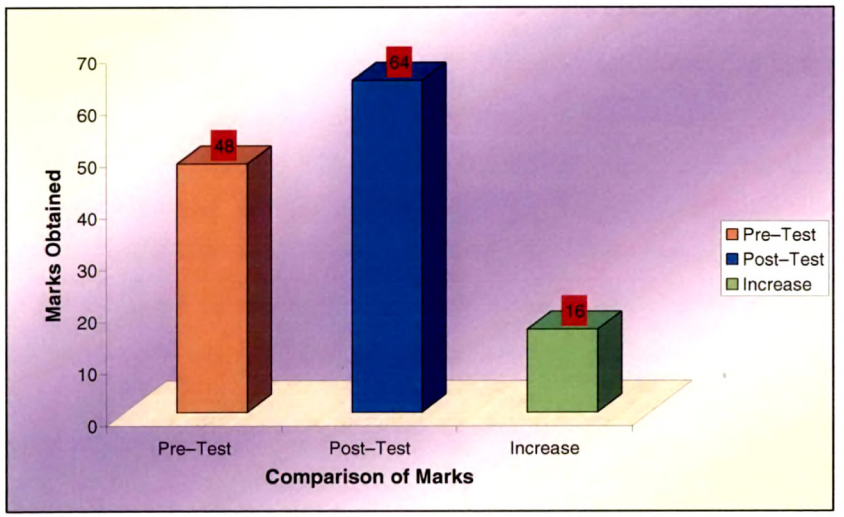
Roll No.	Name	School Name
7	Prajapati Kinjal R.	Bright School

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	64
Marks of Class IX (Pre–Test)	48
Aggregate Increase in Marks	16

Figure – 6:

Individual Achievement of Roll No. 7 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **sixteen** marks after implementation of the programme.

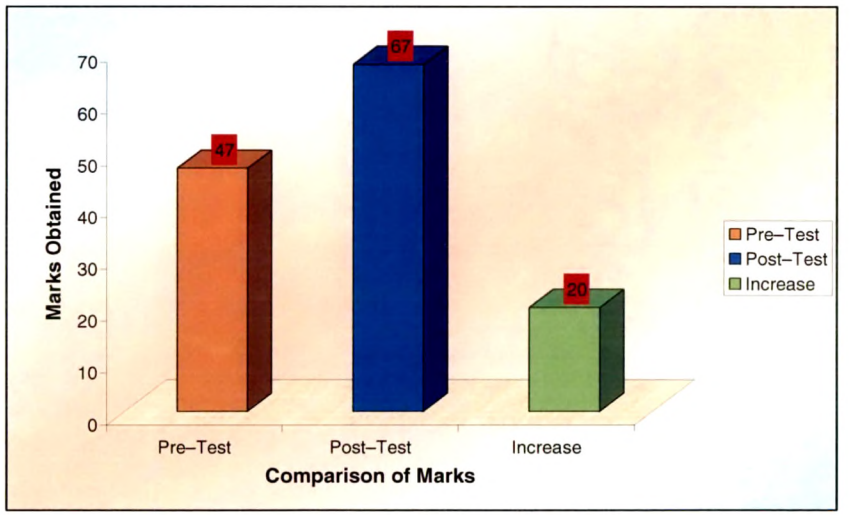
Roll No.	Name	School Name
8	Varma Jay M.	Bright School

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	67
Marks of Class IX (Pre–Test)	47
Aggregate Increase in Marks	20

Figure – 7:

Individual Achievement of Roll No. 8 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twenty** marks after implementation of the programme.

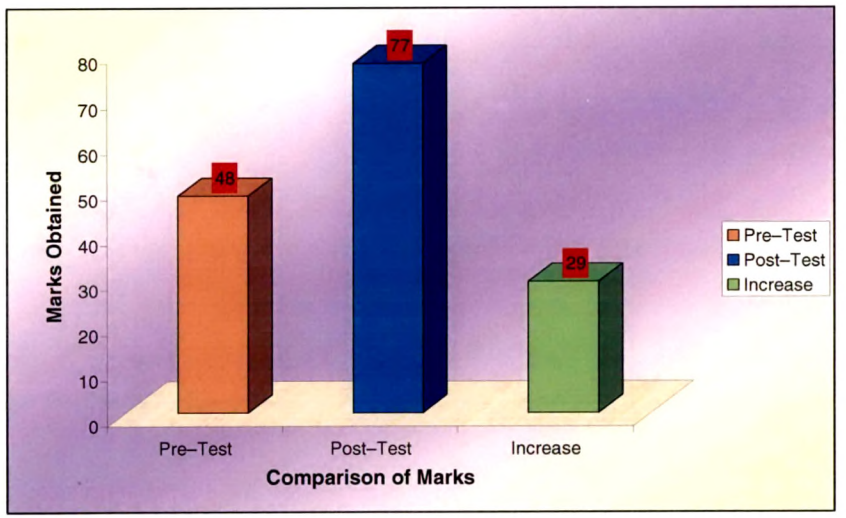
Roll No.	Name	School Name
9	Dhariya Pankil P.	Bright School

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	77
Marks of Class IX (Pre–Test)	48
Aggregate Increase in Marks	29

Figure – 8:

Individual Achievement of Roll No. 9 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twenty nine** marks after implementation of the programme.

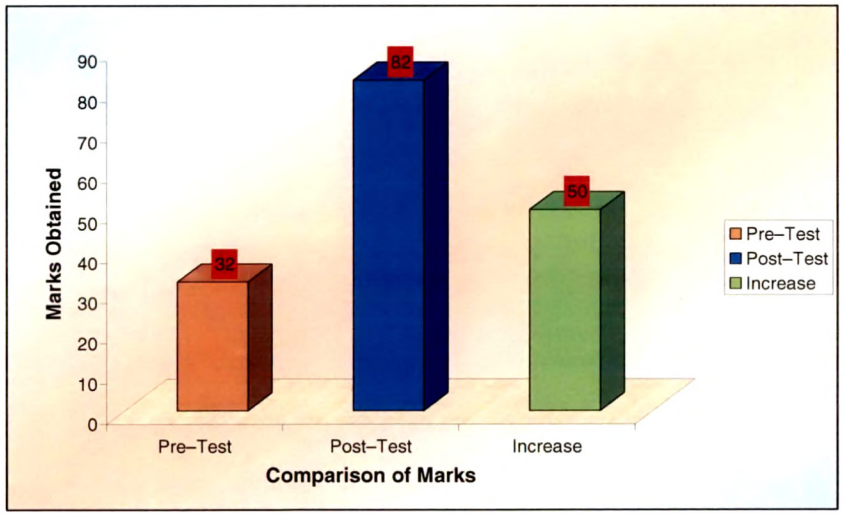
Roll No.	Name	School Name
10	Shah Japan N.	Urmi Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	82
Marks of Class IX (Pre–Test)	32
Aggregate Increase in Marks	50

Figure – 9:

Individual Achievement of Roll No. 10 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **fifty** marks after implementation of the programme.

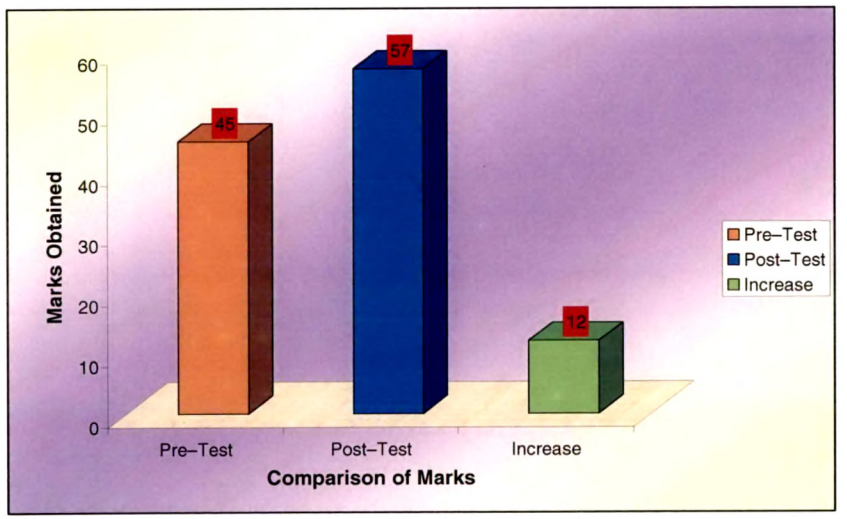
Roll No.	Name	School Name
11	Parmar Chandrika N.	Vasant Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	57
Marks of Class IX (Pre–Test)	45
Aggregate Increase in Marks	12

Figure – 10:

Individual Achievement of Roll No. 11 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twelve** marks after implementation of the programme.

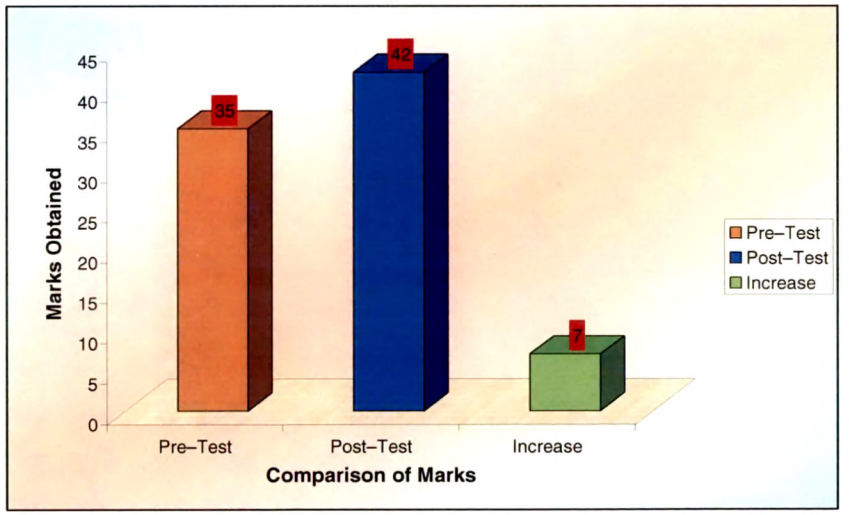
Roll No.	Name	School Name
12	Kansara Kushboo R.	Vasant Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	42
Marks of Class IX (Pre–Test)	35
Aggregate Increase in Marks	7

Figure – 11:

Individual Achievement of Roll No. 12 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **seven** marks after implementation of the programme.

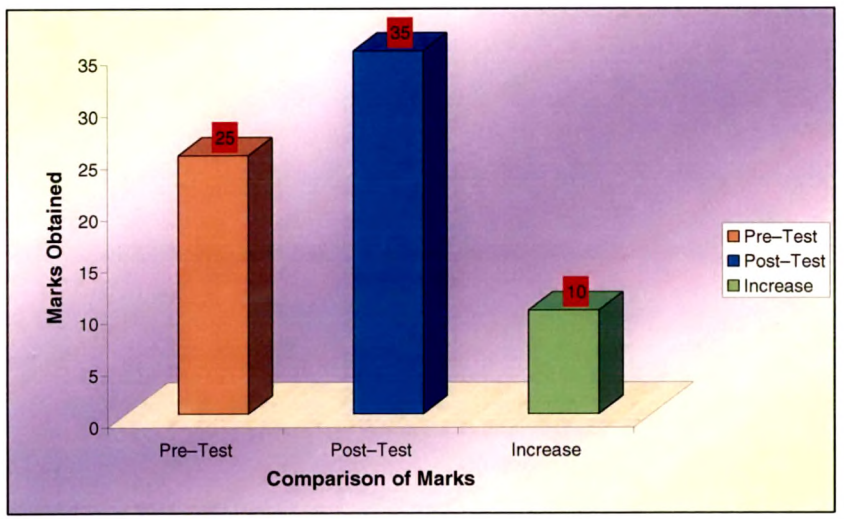
Roll No.	Name	School Name
13	Shah Jaydeep J.	Vasant Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	35
Marks of Class IX (Pre–Test)	25
Aggregate Increase in Marks	10

Figure – 12:

Individual Achievement of Roll No. 13 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **ten** marks after implementation of the programme.

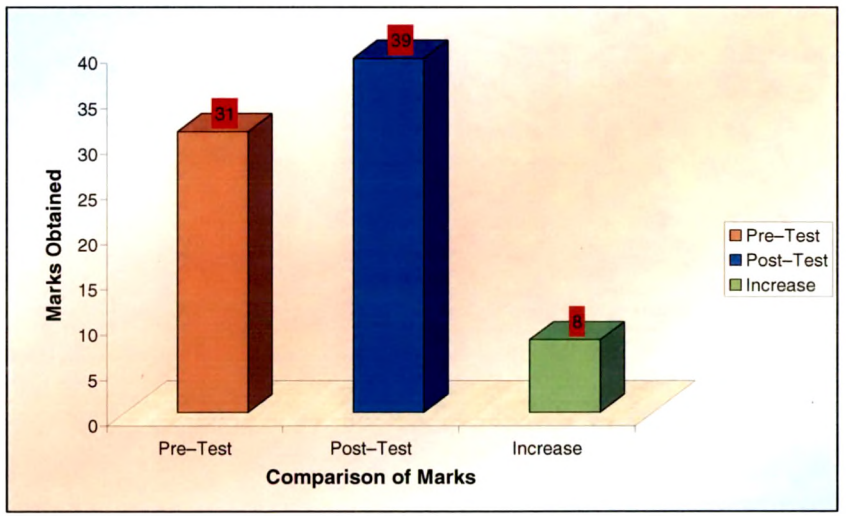
Roll No.	Name	School Name
14	Kumkar Preeti K.	Sardar Vinay Mandir

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	39
Marks of Class IX (Pre–Test)	31
Aggregate Increase in Marks	8

Figure – 13:

Individual Achievement of Roll No. 14 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **eight** marks after implementation of the programme.

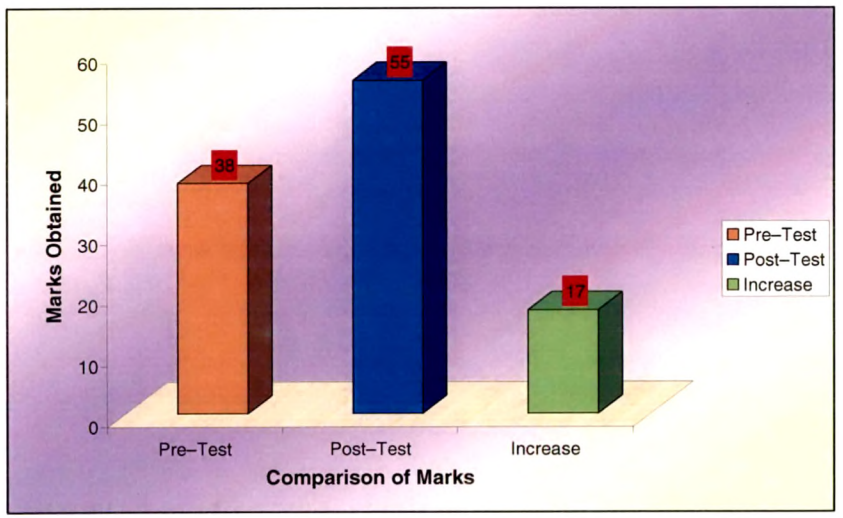
Roll No.	Name	School Name
15	Panchal Piyush D.	Sardar Vinay Mandir

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	55
Marks of Class IX (Pre–Test)	38
Aggregate Increase in Marks	17

Figure – 14:

Individual Achievement of Roll No. 15 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **seventeen** marks after implementation of the programme.

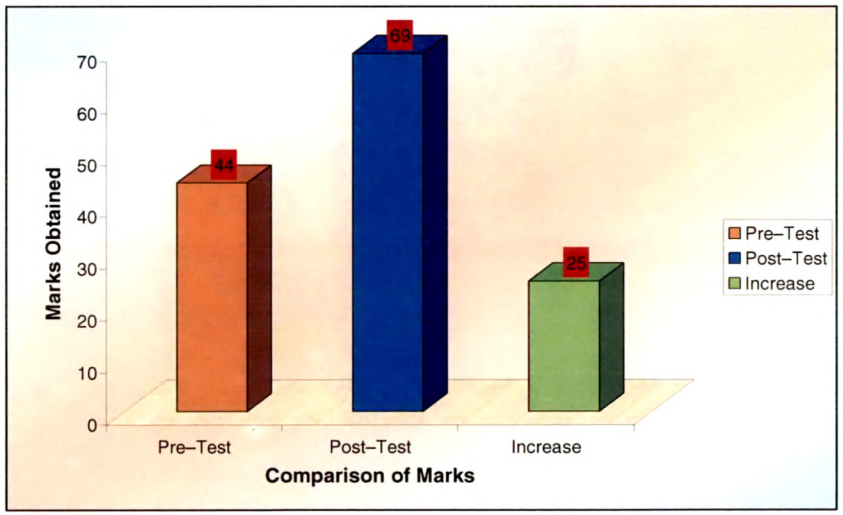
Roll No.	Name	School Name
16	Trivedi Shraddha M.	Sardar Vinay Mandir

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	69
Marks of Class IX (Pre–Test)	44
Aggregate Increase in Marks	25

Figure – 15:

Individual Achievement of Roll No. 16 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twenty five** marks after implementation of the programme.

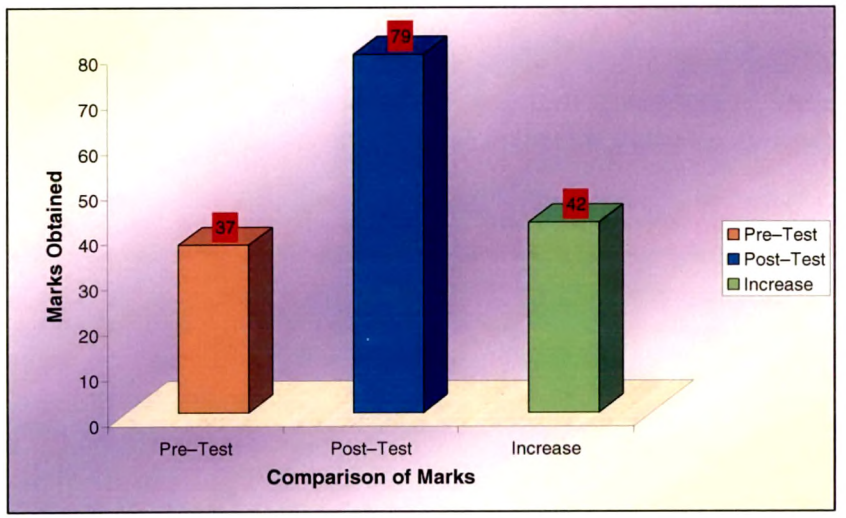
Roll No.	Name	School Name
17	Patel Ripal S.	Sardar Vinay Mandir

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	79
Marks of Class IX (Pre–Test)	37
Aggregate Increase in Marks	42

Figure – 16:

Individual Achievement of Roll No. 17 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **fourty two** marks after implementation of the programme.

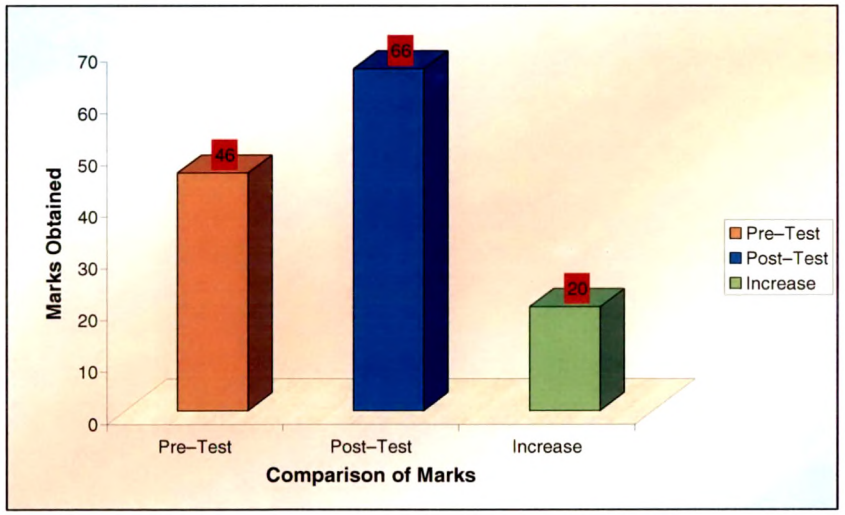
Roll No.	Name	School Name
18	Parekh Mitul B.	Sardar Vinay Mandir

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	66
Marks of Class IX (Pre–Test)	46
Aggregate Increase in Marks	20

Figure – 17:

Individual Achievement of Roll No. 18 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twenty** marks after implementation of the programme.

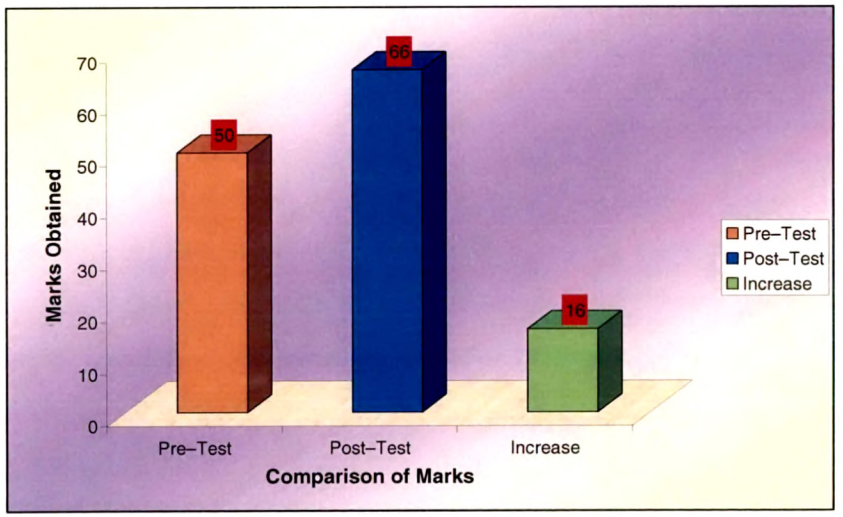
Roll No.	Name	School Name
19	Tanna Bhavin R.	Sardar Vinay Mandir

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	66
Marks of Class IX (Pre–Test)	50
Aggregate Increase in Marks	16

Figure – 18:

Individual Achievement of Roll No. 19 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **sixteen** marks after implementation of the programme.

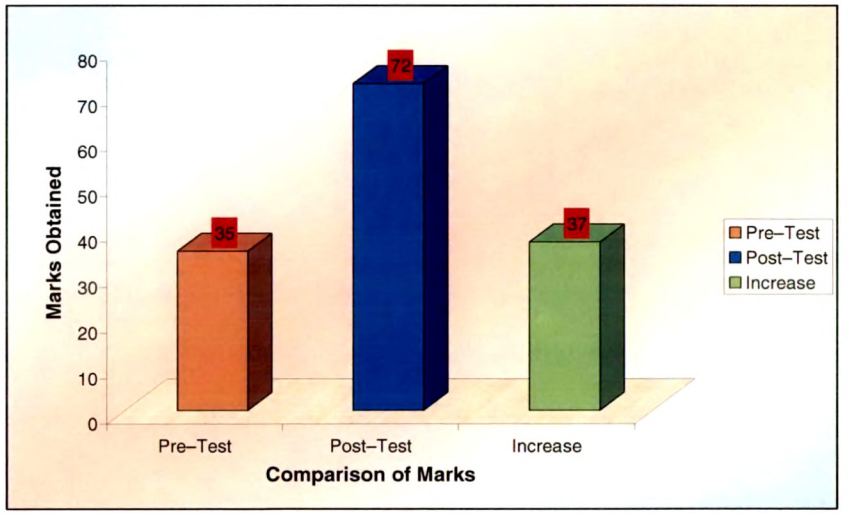
Roll No.	Name	School Name
20	Patel Priyanka J.	Lal Bahadur Shastri Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	72
Marks of Class IX (Pre–Test)	35
Aggregate Increase in Marks	37

Figure – 19:

Individual Achievement of Roll No. 20 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **thirty seven** marks after implementation of the programme.

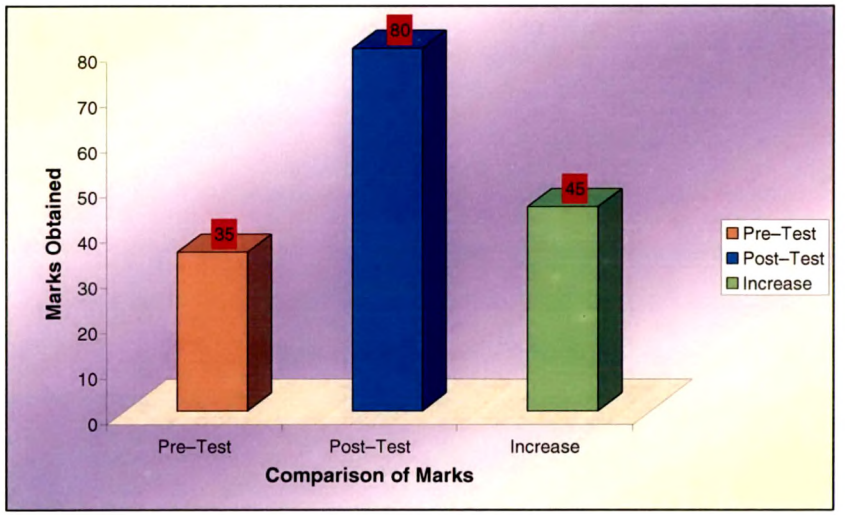
Roll No.	Name	School Name
21	Joshi Sangeeta C.	Ambe Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	80
Marks of Class IX (Pre–Test)	35
Aggregate Increase in Marks	45

Figure – 20:

Individual Achievement of Roll No. 21 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **fourty five** marks after implementation of the programme.

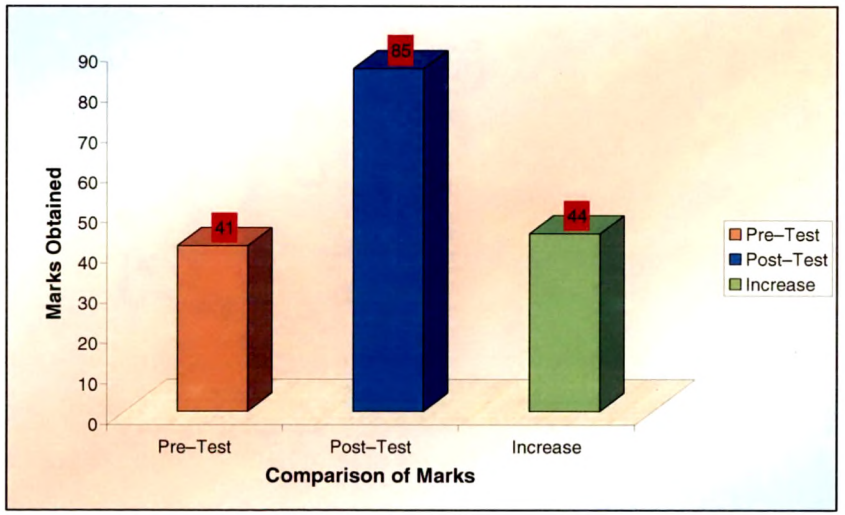
Roll No.	Name	School Name
22	Patel Jahanvi B.	New Era

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	85
Marks of Class IX (Pre–Test)	41
Aggregate Increase in Marks	44

Figure – 21:

Individual Achievement of Roll No. 22 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **fourty four** marks after implementation of the programme.

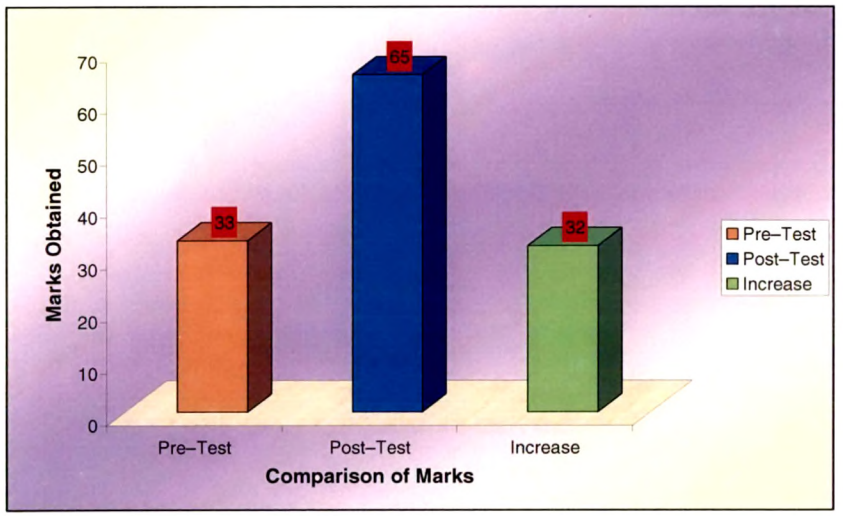
Roll No.	Name	School Name
23	Trivedi Manasi D.	Rosary School

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	65
Marks of Class IX (Pre–Test)	33
Aggregate Increase in Marks	32

Figure – 22:

Individual Achievement of Roll No. 23 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **thirty two** marks after implementation of the programme.

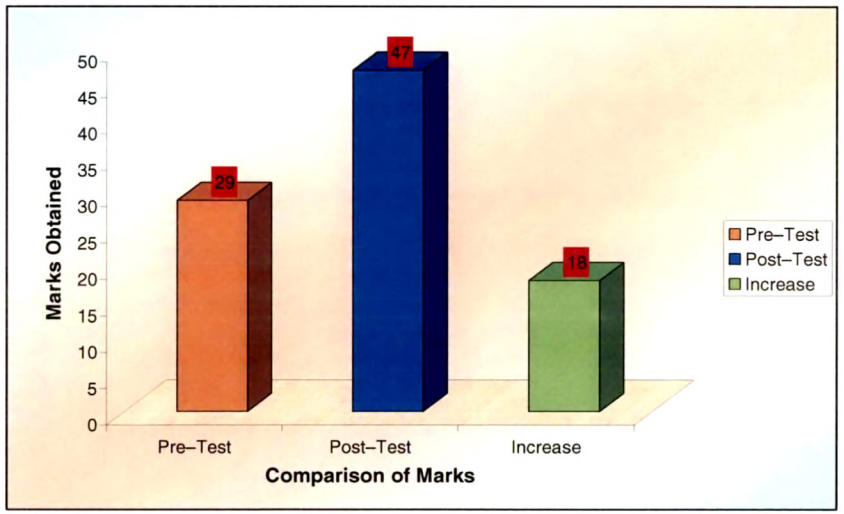
Roll No.	Name	School Name
24	Thakkar Neel J.	Rosary School

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	47
Marks of Class IX (Pre–Test)	29
Aggregate Increase in Marks	18

Figure – 23:

Individual Achievement of Roll No. 24 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **eighteen** marks after implementation of the programme.

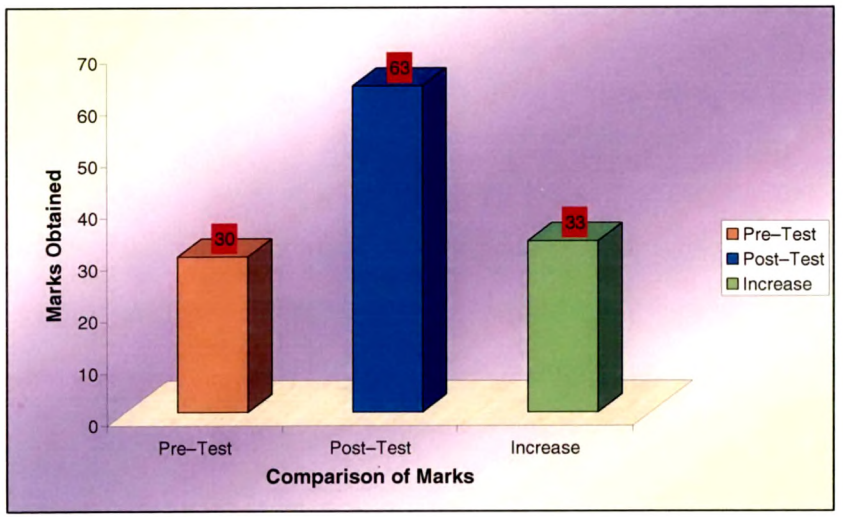
Roll No.	Name	School Name
25	Pagar Pranav S.	Rosary School

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	63
Marks of Class IX (Pre–Test)	30
Aggregate Increase in Marks	33

Figure – 24:

Individual Achievement of Roll No. 25 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **thirty three** marks after implementation of the programme.

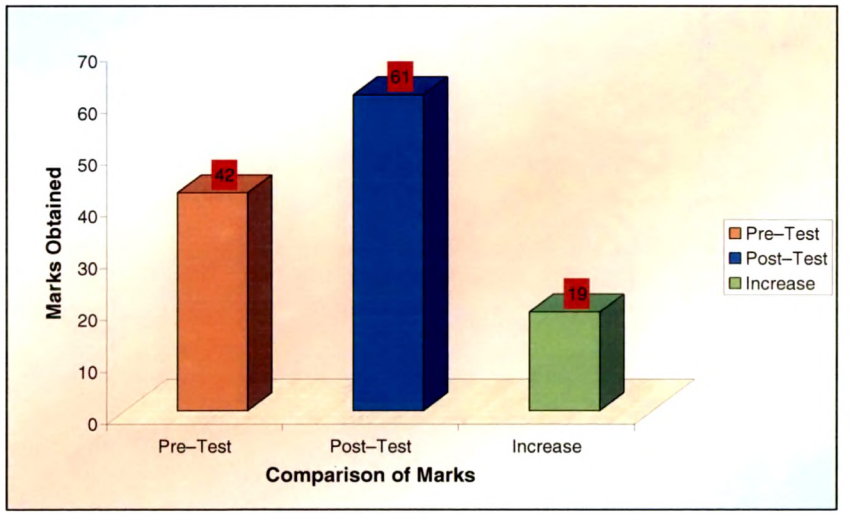
Roll No.	Name	School Name
27	Parmar Vijay M.	Jivan Chetna Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	61
Marks of Class IX (Pre–Test)	42
Aggregate Increase in Marks	19

Figure – 25:

Individual Achievement of Roll No. 27 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **nineteen** marks after implementation of the programme.

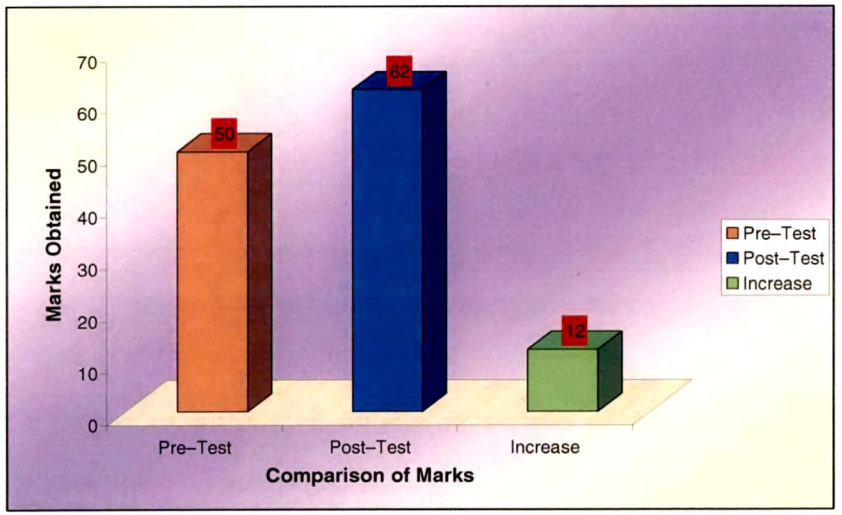
Roll No.	Name	School Name
28	Bhatt Sagar S.	Pratap High School

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	62
Marks of Class IX (Pre–Test)	50
Aggregate Increase in Marks	12

Figure – 26:

Individual Achievement of Roll No. 28 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twelve** marks after implementation of the programme.

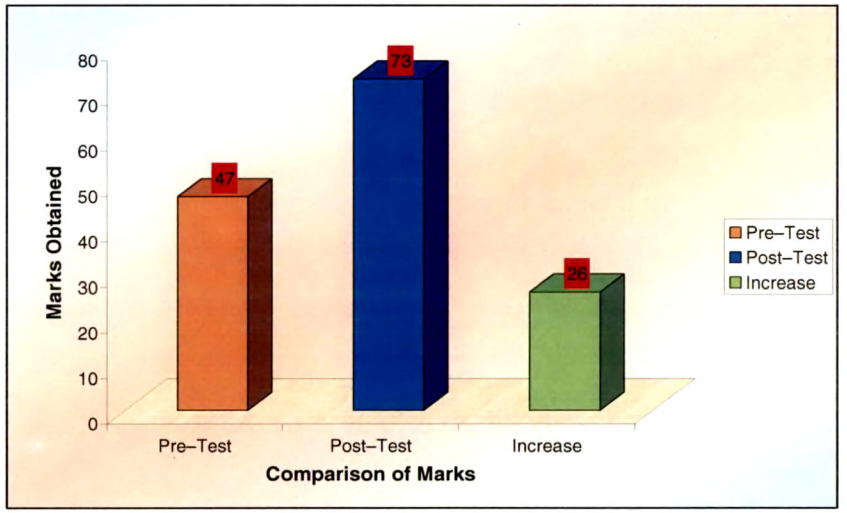
Roll No.	Name	School Name
29	Desai Anita J.	Nutan Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	73
Marks of Class IX (Pre–Test)	47
Aggregate Increase in Marks	26

Figure – 27:

Individual Achievement of Roll No. 29 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twenty six** marks after implementation of the programme.

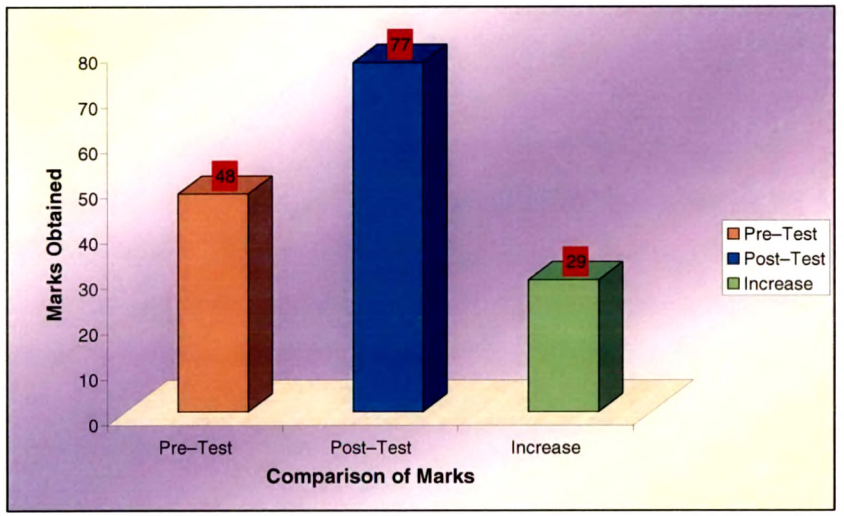
Roll No.	Name	School Name
30	Chauhan Namrata D.	Saraswati Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	77
Marks of Class IX (Pre–Test)	48
Aggregate Increase in Marks	29

Figure – 28:

Individual Achievement of Roll No. 30 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twenty nine** marks after implementation of the programme.

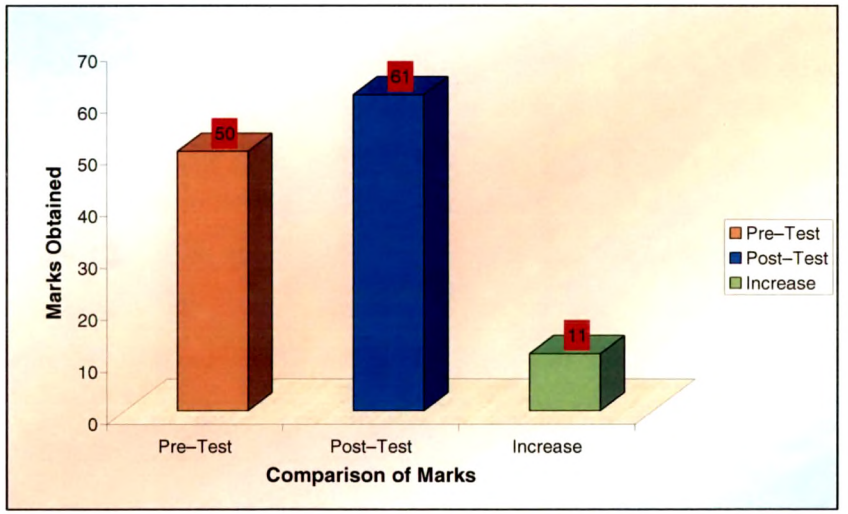
Roll No.	Name	School Name
31	Prajapati Rakesh S.	Saraswati Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	61
Marks of Class IX (Pre–Test)	50
Aggregate Increase in Marks	11

Figure – 29:

Individual Achievement of Roll No. 31 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **eleven** marks after implementation of the programme.

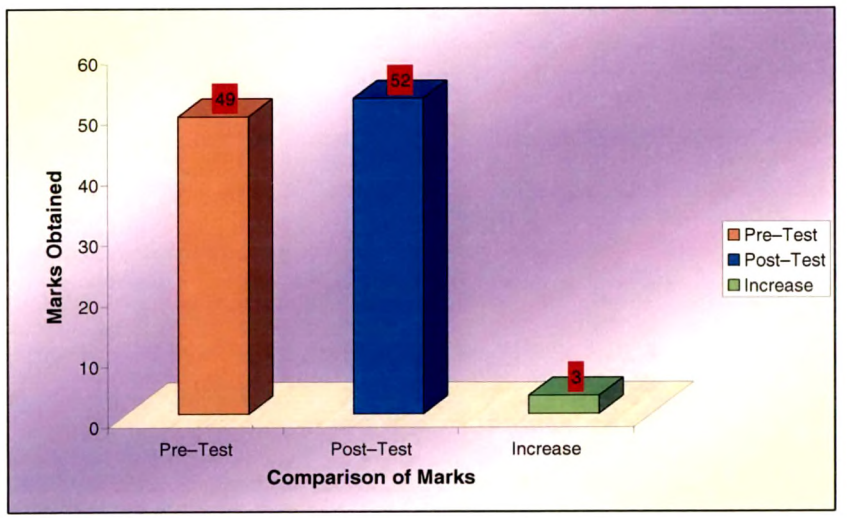
Roll No.	Name	School Name
33	Bhosle Ankur A.	University Experimental School

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	52
Marks of Class IX (Pre–Test)	49
Aggregate Increase in Marks	3

Figure – 30:

Individual Achievement of Roll No. 33 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **three** marks after implementation of the programme.

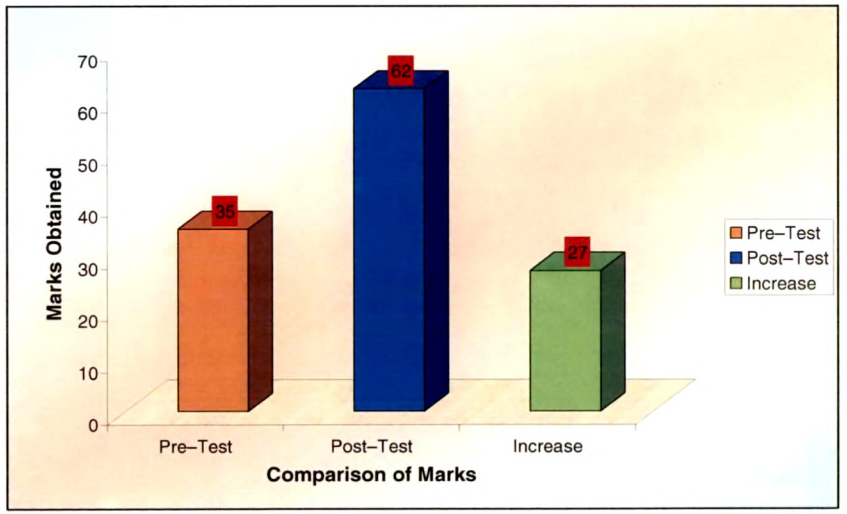
Roll No.	Name	School Name
34	Deshmukh Vipra Y.	Krunal Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	62
Marks of Class IX (Pre–Test)	35
Aggregate Increase in Marks	27

Figure – 31:

Individual Achievement of Roll No. 34 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twenty seven** marks after implementation of the programme.

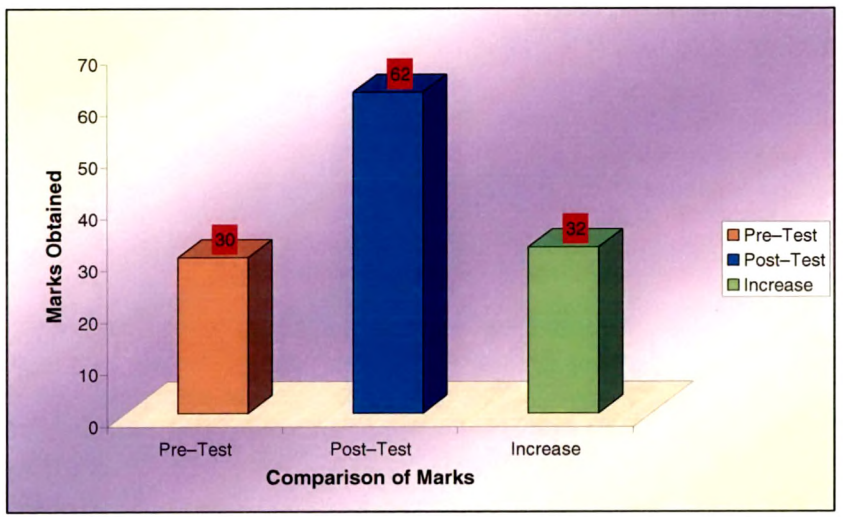
Roll No.	Name	School Name
35	Patel Priyal C.	Alembic Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	62
Marks of Class IX (Pre–Test)	30
Aggregate Increase in Marks	32

Figure – 32:

Individual Achievement of Roll No. 35 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **thirty two** marks after implementation of the programme.

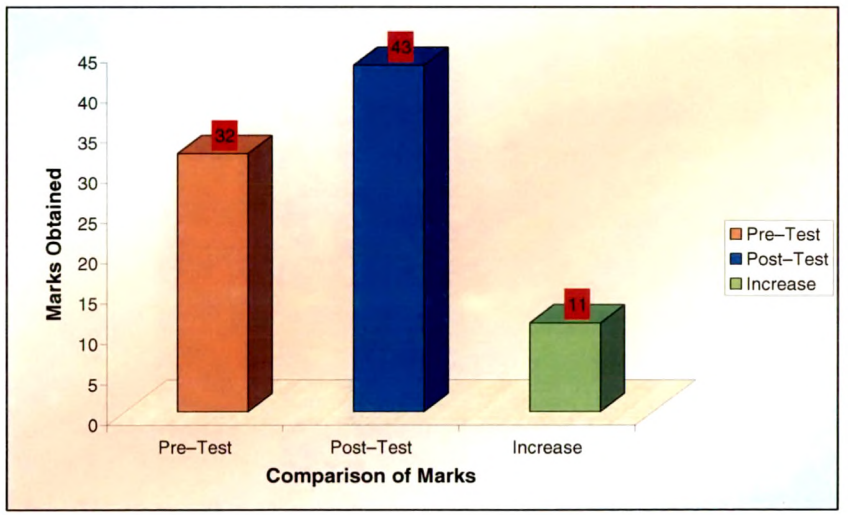
Roll No.	Name	School Name
37	Mistry Arjun D.	Alembic Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	43
Marks of Class IX (Pre–Test)	32
Aggregate Increase in Marks	11

Figure – 33:

Individual Achievement of Roll No. 37 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **eleven** marks after implementation of the programme.

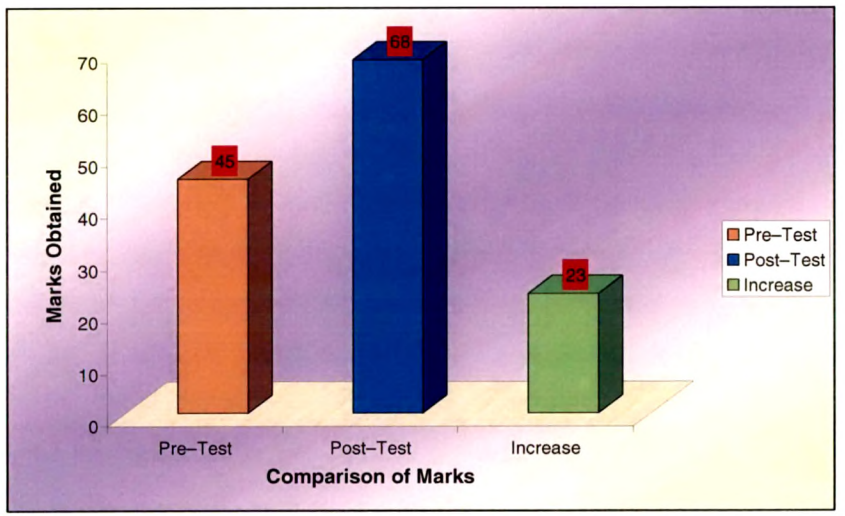
Roll No.	Name	School Name
38	Surati Dhaval D.	Vidhyut Board Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	68
Marks of Class IX (Pre–Test)	45
Aggregate Increase in Marks	23

Figure – 34:

Individual Achievement of Roll No. 38 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twenty three** marks after implementation of the programme.

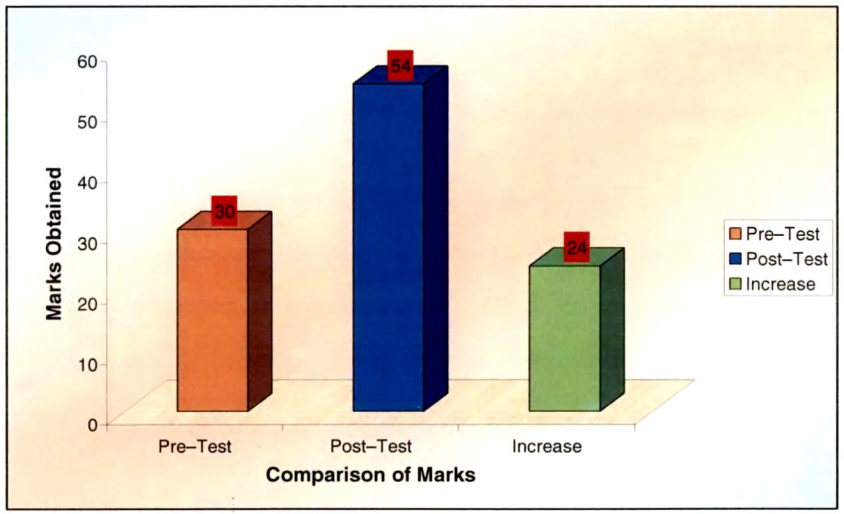
Roll No.	Name	School Name
39	Prajapati Krunal V.	Vidhyut Board Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	54
Marks of Class IX (Pre–Test)	30
Aggregate Increase in Marks	24

Figure – 35:

Individual Achievement of Roll No. 39 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twenty four** marks after implementation of the programme.

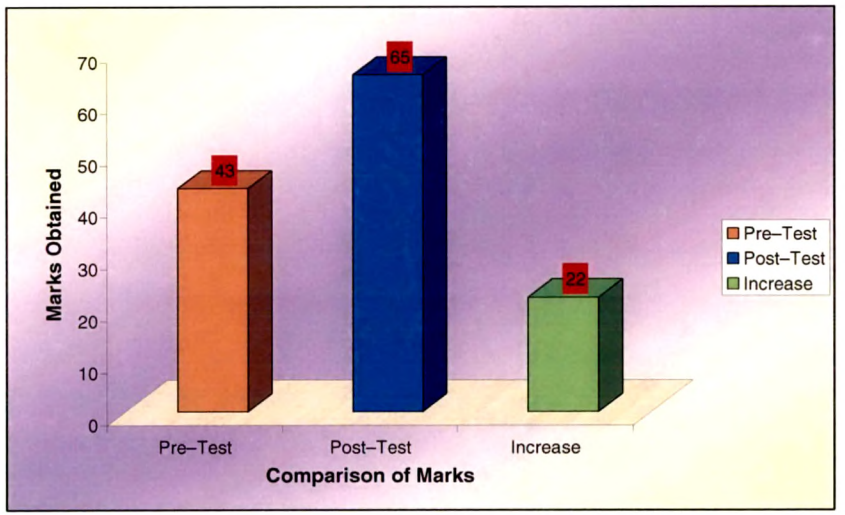
Roll No.	Name	School Name
40	Patel Nupur N.	Vidhyut Board Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	65
Marks of Class IX (Pre–Test)	43
Aggregate Increase in Marks	22

Figure – 36:

Individual Achievement of Roll No. 40 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twenty two** marks after implementation of the programme.

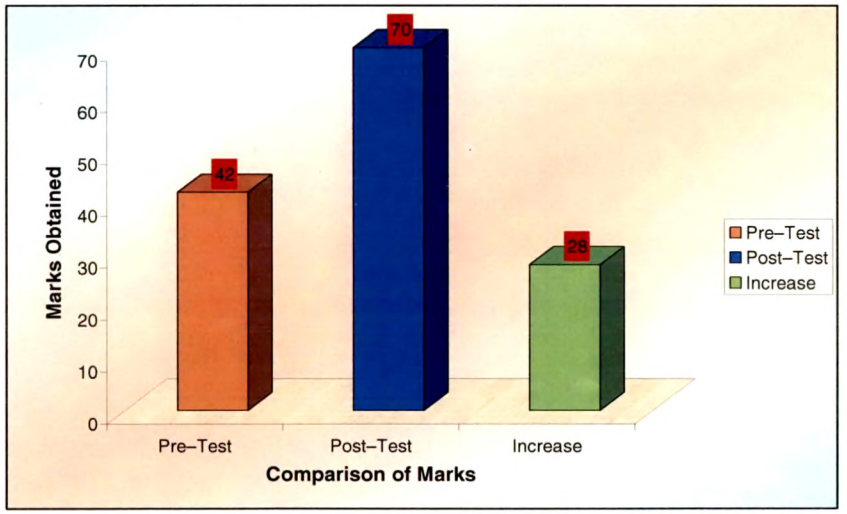
Roll No.	Name	School Name
41	Sharma Prateek D.	Vidhyut Board Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	70
Marks of Class IX (Pre–Test)	42
Aggregate Increase in Marks	28

Figure – 37:

Individual Achievement of Roll No. 41 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twenty eight** marks after implementation of the programme.

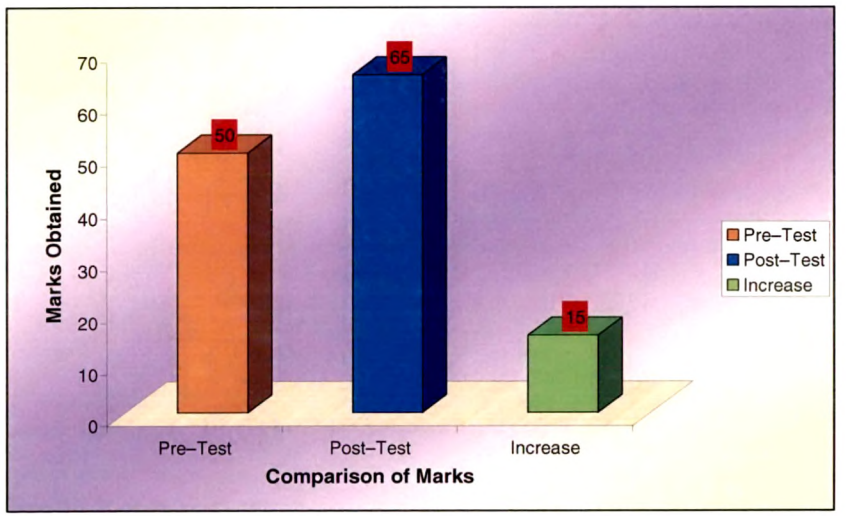
Roll No.	Name	School Name
42	Dangee Dixit M.	Satyanarayan Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	65
Marks of Class IX (Pre–Test)	50
Aggregate Increase in Marks	15

Figure – 38:

Individual Achievement of Roll No. 42 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **fifteen** marks after implementation of the programme.

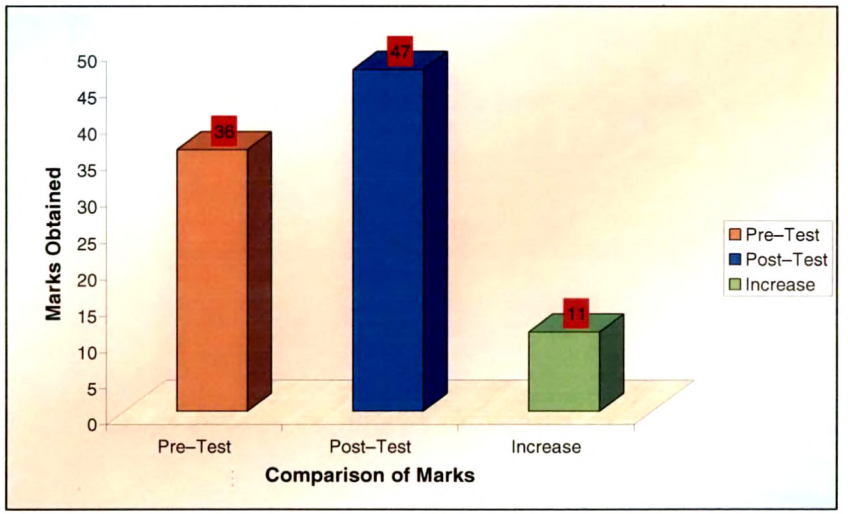
Roll No.	Name	School Name
43	Shreemail Komal H.	Satyanarayan Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	47
Marks of Class IX (Pre–Test)	36
Aggregate Increase in Marks	11

Figure – 39:

Individual Achievement of Roll No. 43 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **eleven** marks after implementation of the programme.

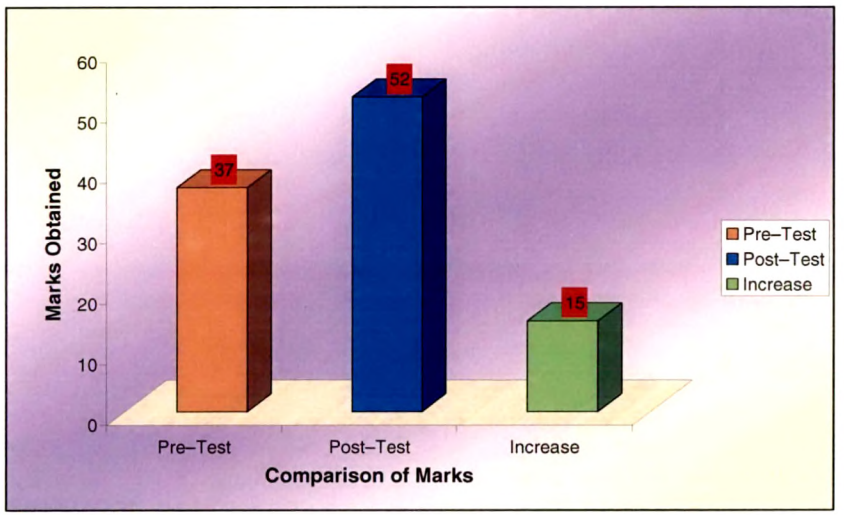
Roll No.	Name	School Name
44	Jethwa Sumeet P.	Vidhya Vikas Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	52
Marks of Class IX (Pre–Test)	37
Aggregate Increase in Marks	15

Figure – 40:

Individual Achievement of Roll No. 44 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **fifteen** marks after implementation of the programme.

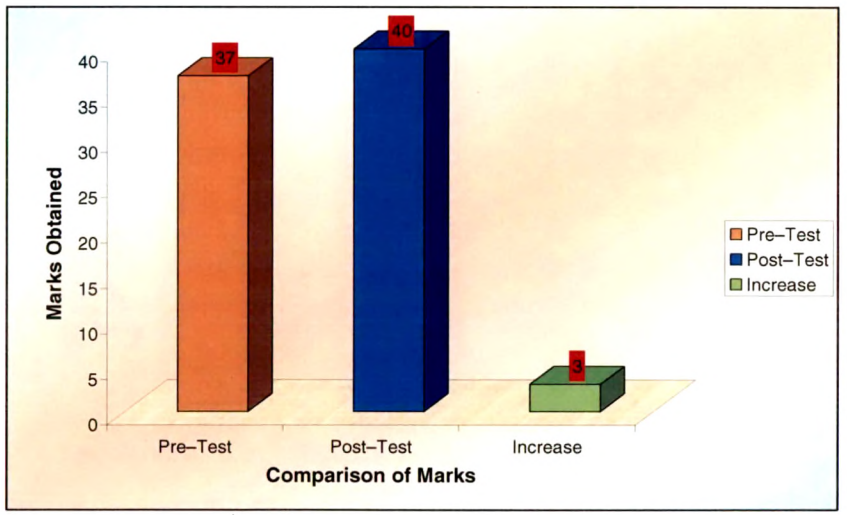
Roll No.	Name	School Name
45	Parmar Anil K.	Vidhya Vikas Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	40
Marks of Class IX (Pre–Test)	37
Aggregate Increase in Marks	3

Figure – 41:

Individual Achievement of Roll No. 45 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **three** marks after implementation of the programme.

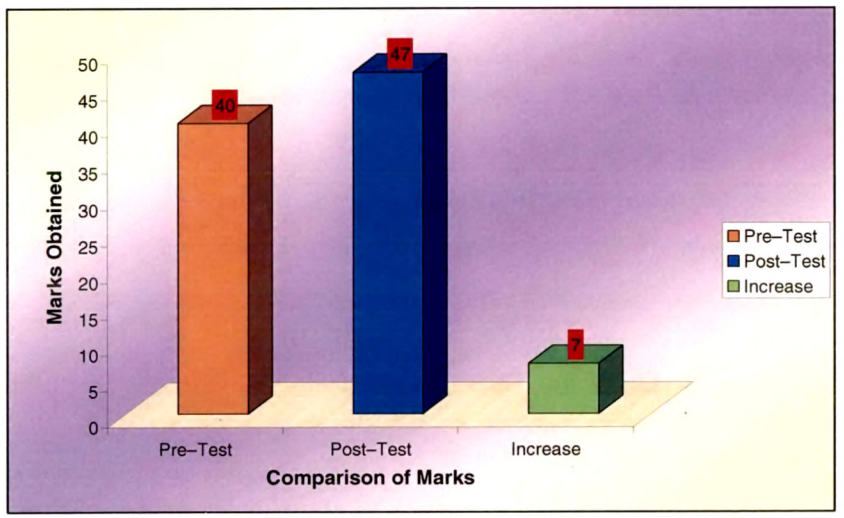
Roll No.	Name	School Name
46	Chauhan Kishor T.	Vidhya Vikas Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	47
Marks of Class IX (Pre–Test)	40
Aggregate Increase in Marks	7

Figure – 42:

Individual Achievement of Roll No. 46 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **seven** marks after implementation of the programme.

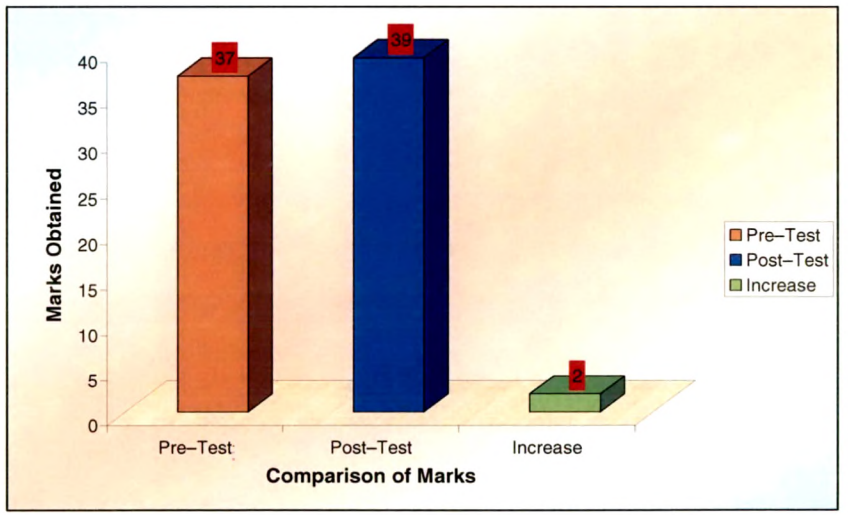
Roll No.	Name	School Name
48	Bhrambhatt Bhavin S.	Vidhya Vikas Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	39
Marks of Class IX (Pre–Test)	37
Aggregate Increase in Marks	2

Figure – 43:

Individual Achievement of Roll No. 48 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **two** marks after implementation of the programme.

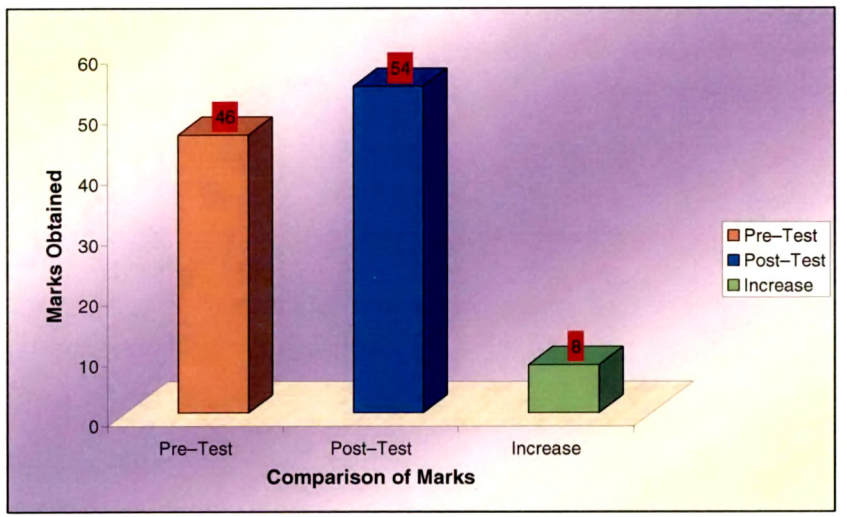
Roll No.	Name	School Name
49	Gohil Pratik P.	Kelavni Trust Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	54
Marks of Class IX (Pre–Test)	46
Aggregate Increase in Marks	8

Figure – 44:

Individual Achievement of Roll No. 49 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **eight** marks after implementation of the programme.

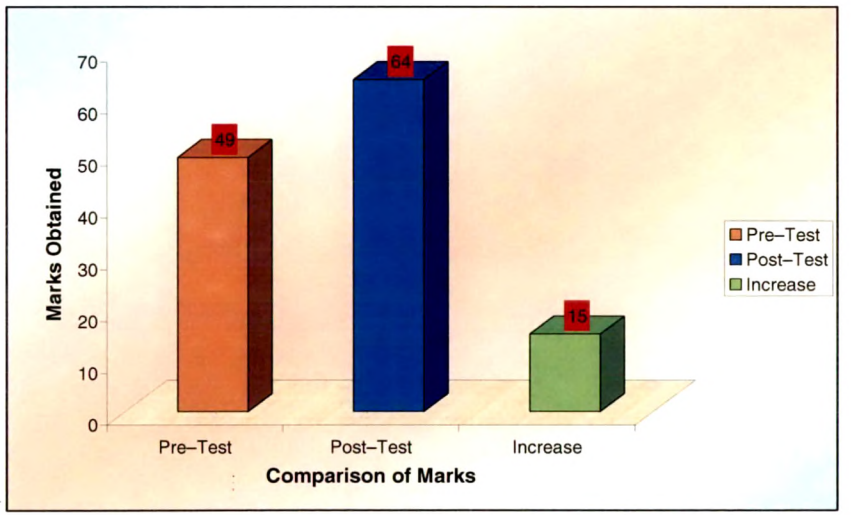
Roll No.	Name	School Name
50	Mehta Tejas A.	Kelavni Trust Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	64
Marks of Class IX (Pre–Test)	49
Aggregate Increase in Marks	15

Figure – 45:

Individual Achievement of Roll No. 50 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **fifteen** marks after implementation of the programme.

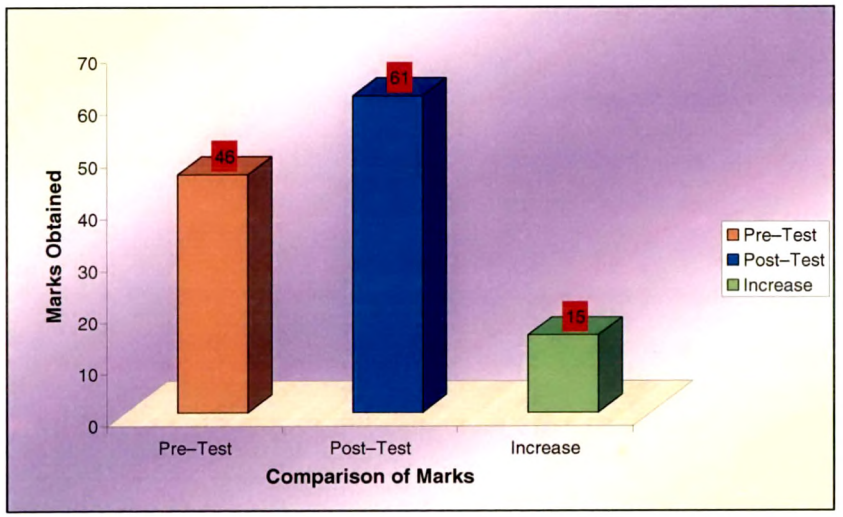
Roll No.	Name	School Name
51	Patel Jaimin P.	Kelavni Trust Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	61
Marks of Class IX (Pre–Test)	46
Aggregate Increase in Marks	15

Figure – 46:

Individual Achievement of Roll No. 51 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **fifteen** marks after implementation of the programme.

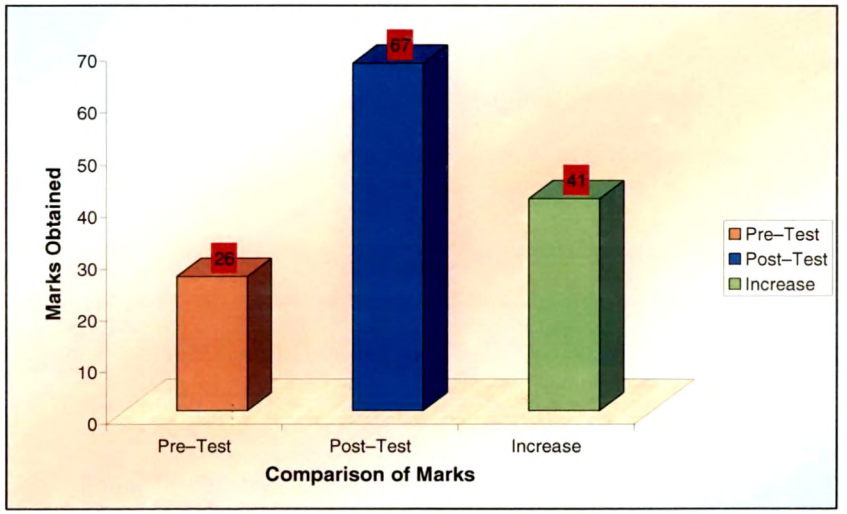
Roll No.	Name	School Name
53	Chauhan Rajeshwari M.	Maharani Kanya Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	67
Marks of Class IX (Pre–Test)	26
Aggregate Increase in Marks	41

Figure – 47:

Individual Achievement of Roll No. 53 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **fourty one** marks after implementation of the programme.

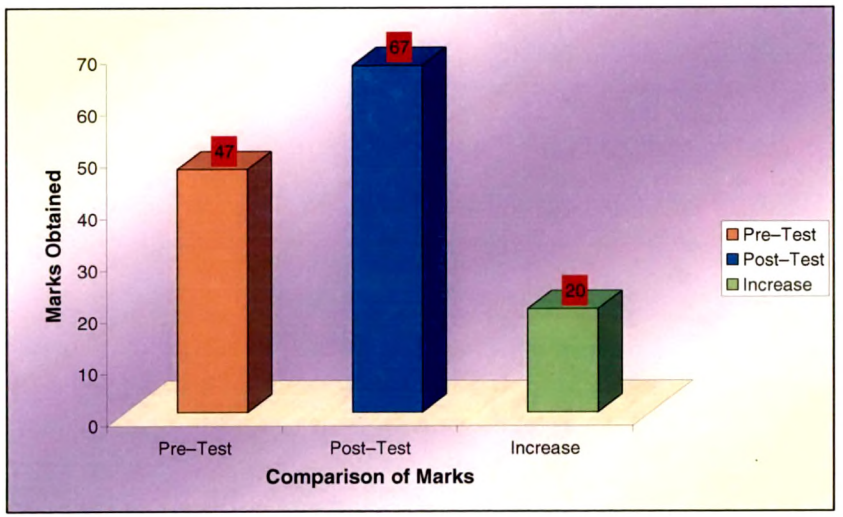
Roll No.	Name	School Name
54	Shah Disha V.	Maharani Kanya Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	67
Marks of Class IX (Pre–Test)	47
Aggregate Increase in Marks	20

Figure – 48:

Individual Achievement of Roll No. 54 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twenty** marks after implementation of the programme.

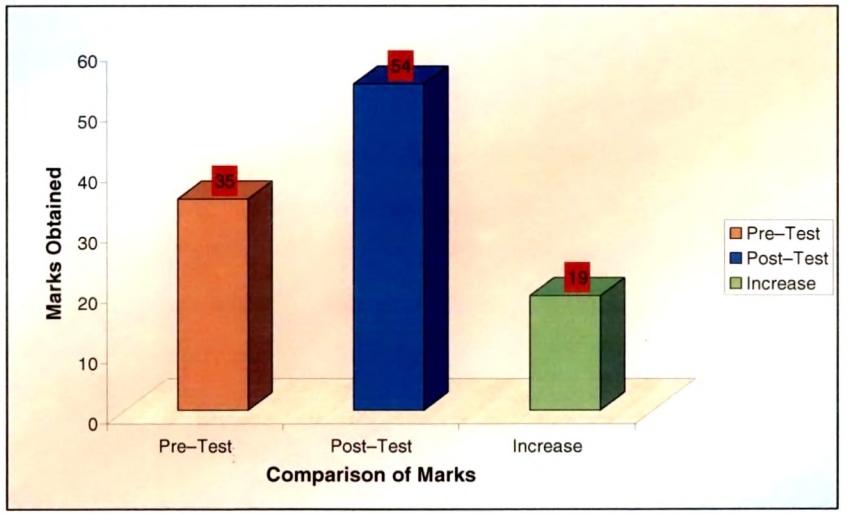
Roll No.	Name	School Name
55	Pandya Maulik D.	Utkarsh Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	54
Marks of Class IX (Pre–Test)	35
Aggregate Increase in Marks	19

Figure – 49:

Individual Achievement of Roll No. 55 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **nineteen** marks after implementation of the programme.

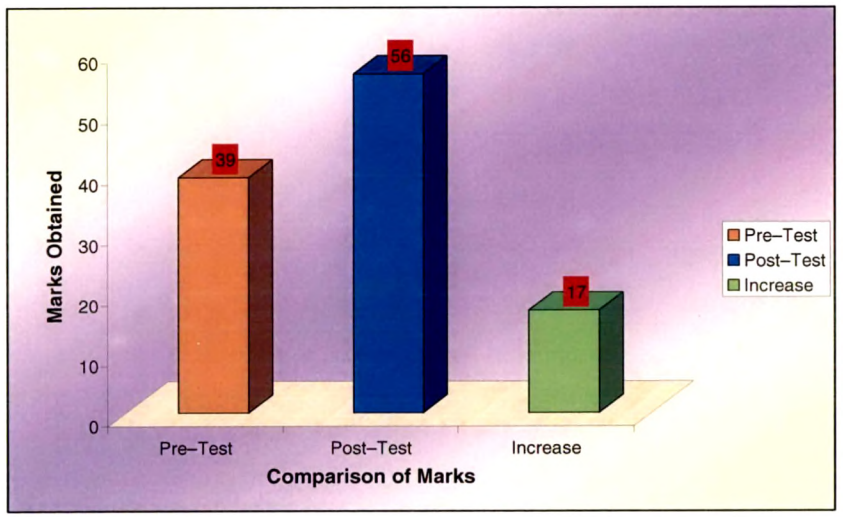
Roll No.	Name	School Name
57	Desai Javalant V.	Vidhya Vihar High School

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	56
Marks of Class IX (Pre–Test)	39
Aggregate Increase in Marks	17

Figure – 50:

Individual Achievement of Roll No. 57 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **seventeen** marks after implementation of the programme.

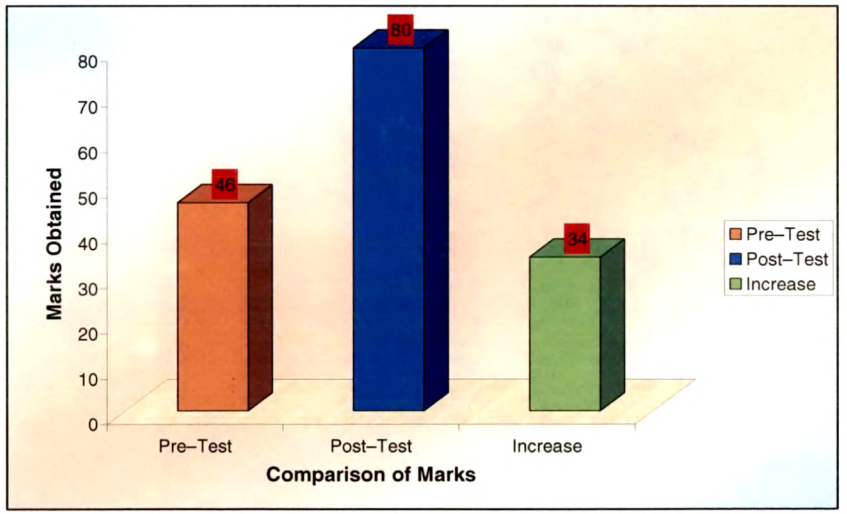
Roll No.	Name	School Name
58	Patel Durgesh A.	Vidhya Vihar High School

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	80
Marks of Class IX (Pre–Test)	46
Aggregate Increase in Marks	34

Figure – 51:

Individual Achievement of Roll No. 58 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **thirty four** marks after implementation of the programme.

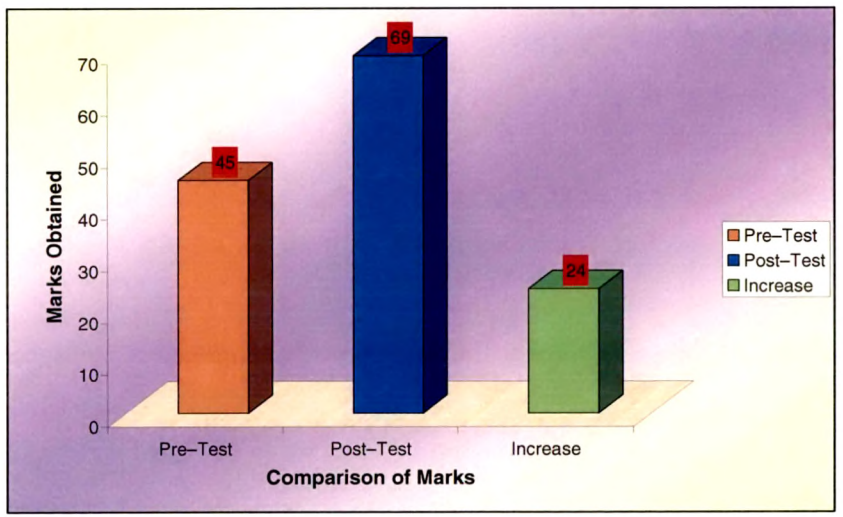
Roll No.	Name	School Name
61	Rao Bijal H.	Nutan Vidhyalaya, Subhanpura

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	69
Marks of Class IX (Pre–Test)	45
Aggregate Increase in Marks	24

Figure – 52:

Individual Achievement of Roll No. 61 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twenty four** marks after implementation of the programme.

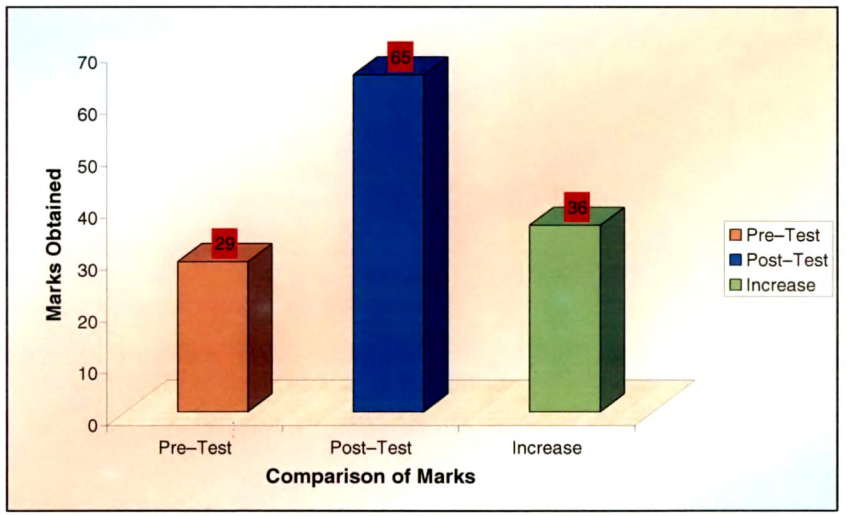
Roll No.	Name	School Name
62	Mansuri Uzma A.	Maharani Kanya Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	65
Marks of Class IX (Pre–Test)	29
Aggregate Increase in Marks	36

Figure – 53:

Individual Achievement of Roll No. 62 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **thirty six** marks after implementation of the programme.

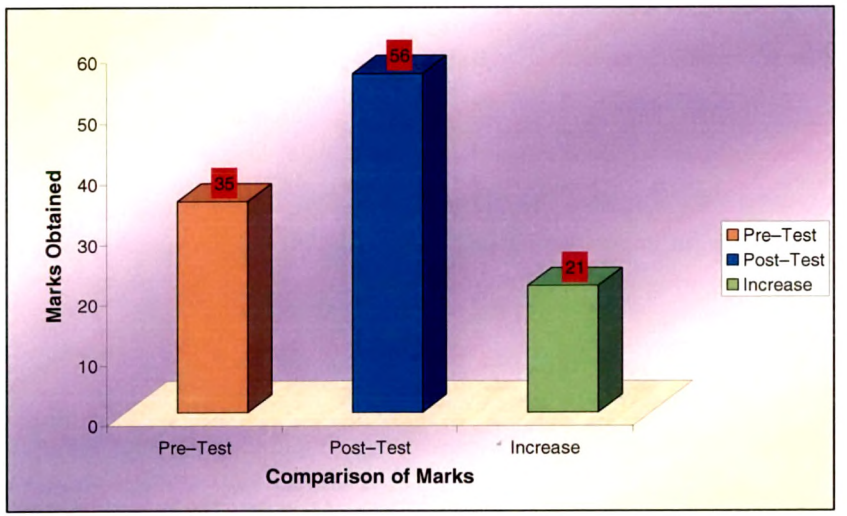
Roll No.	Name	School Name
63	Shah Manali S.	Maharani Kanya Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	56
Marks of Class IX (Pre–Test)	35
Aggregate Increase in Marks	21

Figure – 54:

Individual Achievement of Roll No. 63 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twenty one** marks after implementation of the programme.

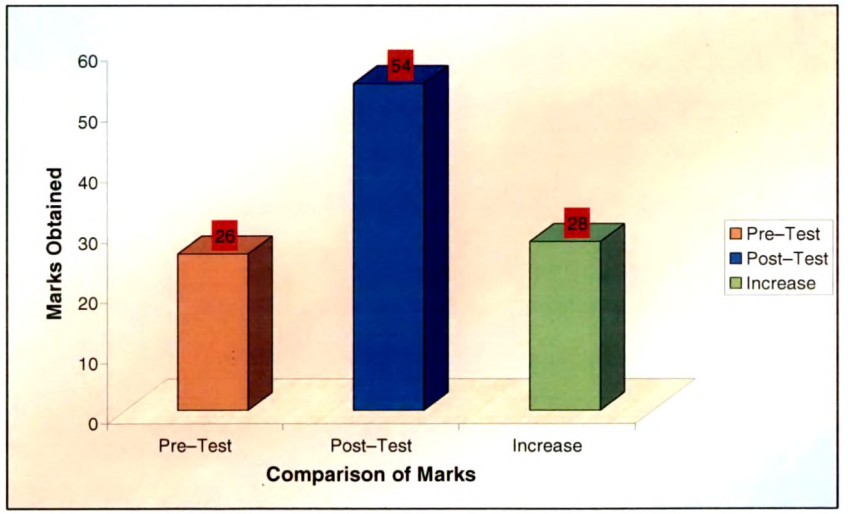
Roll No.	Name	School Name
64	Patel Kinjal S.	Maharani Kanya Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	54
Marks of Class IX (Pre–Test)	26
Aggregate Increase in Marks	28

Figure – 55:

Individual Achievement of Roll No. 64 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **twenty eight** marks after implementation of the programme.

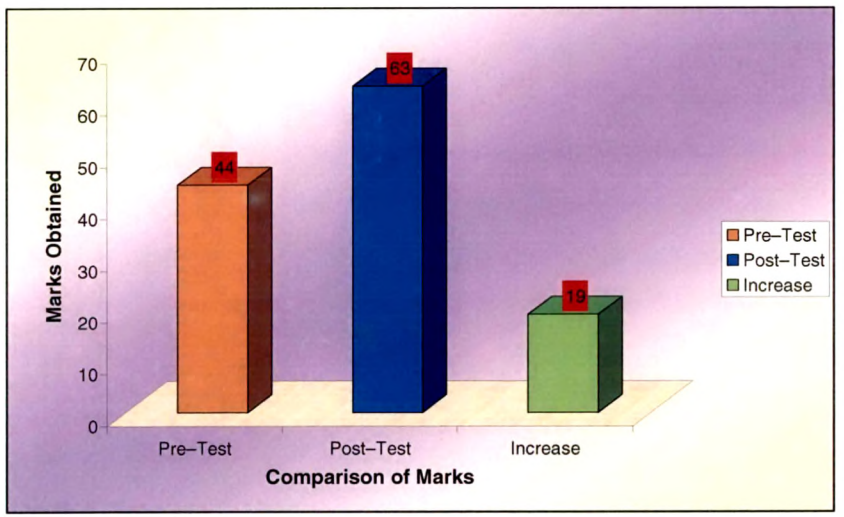
Roll No.	Name	School Name
65	Chokshi Prachi S.	Maharani Kanya Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	63
Marks of Class IX (Pre–Test)	44
Aggregate Increase in Marks	19

Figure – 56:

Individual Achievement of Roll No. 65 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **nineteen** marks after implementation of the programme.

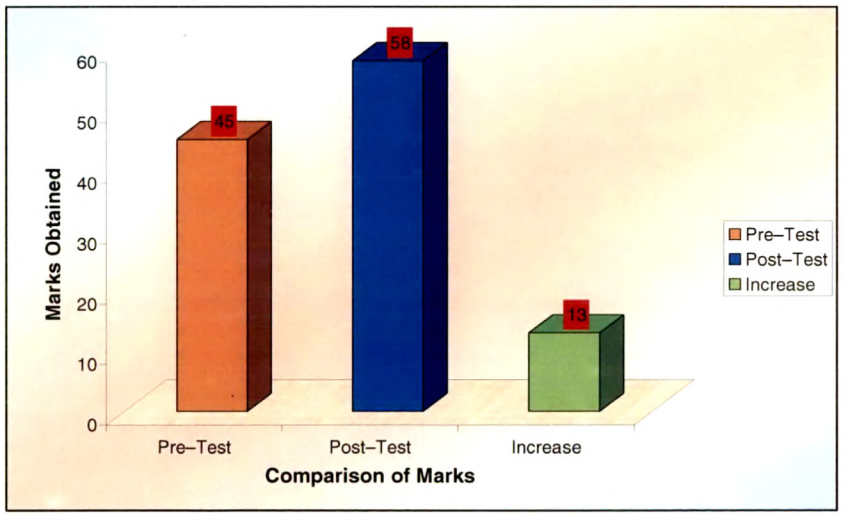
Roll No.	Name	School Name
66	Bhoite Ganesh P.	Navjivan High School

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	58
Marks of Class IX (Pre–Test)	45
Aggregate Increase in Marks	13

Figure – 57:

Individual Achievement of Roll No. 66 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **thirteen** marks after implementation of the programme.

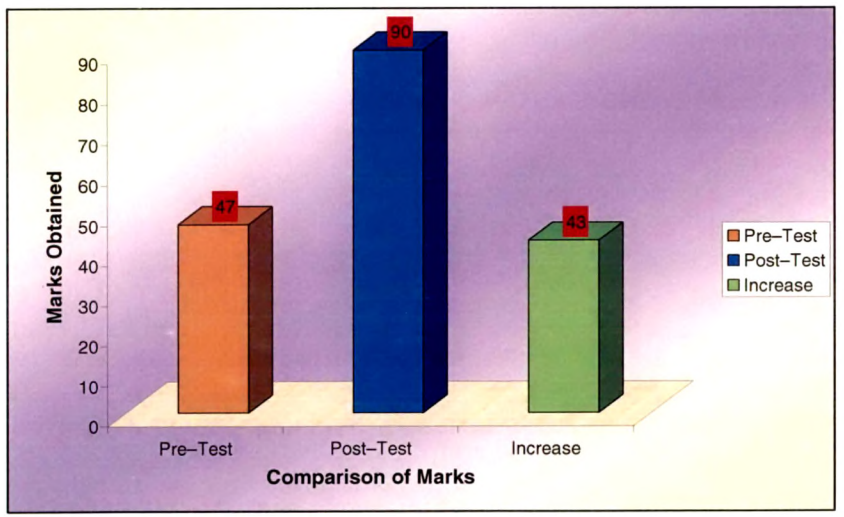
Roll No.	Name	School Name
67	Bhatiya Kashmira B.	Sardar Vallabhbhai Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	90
Marks of Class IX (Pre–Test)	47
Aggregate Increase in Marks	43

Figure – 58:

Individual Achievement of Roll No. 67 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **fourty three** marks after implementation of the programme.

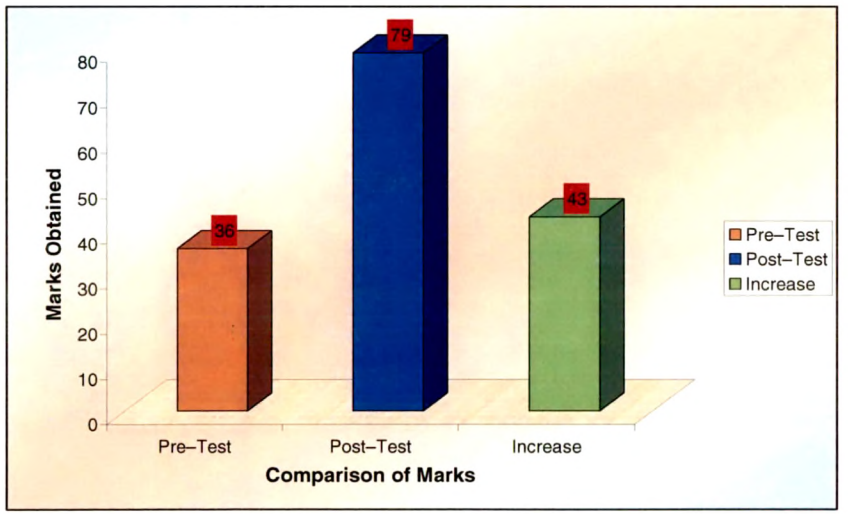
Roll No.	Name	School Name
68	Kayastha Jalpesh N.	Sardar Vallabhbhai Vidhyalaya

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	79
Marks of Class IX (Pre–Test)	36
Aggregate Increase in Marks	43

Figure – 59:

Individual Achievement of Roll No. 68 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **fourty three** marks after implementation of the programme.

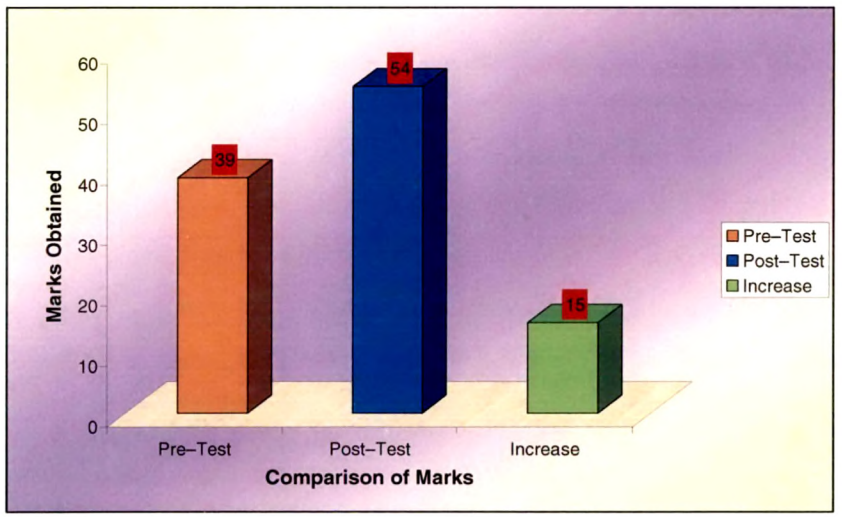
Roll No.	Name	School Name
69	Shah Ankit D.	Zenith High School

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	54
Marks of Class IX (Pre–Test)	39
Aggregate Increase in Marks	15

Figure – 60:

Individual Achievement of Roll No. 69 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **fifteen** marks after implementation of the programme.

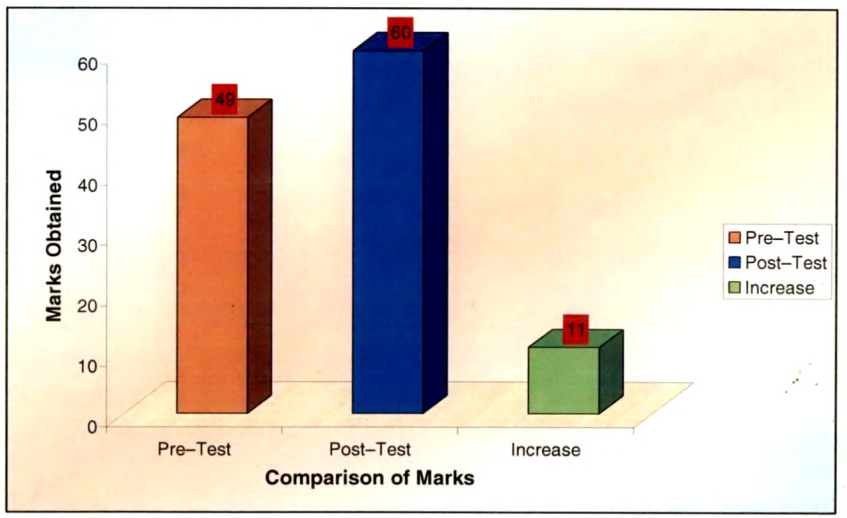
Roll No.	Name	School Name
70	Gosai Chirag S.	H. S. Patel High School

Marks of Pre–Test and Post–Test

Marks of Final Achievement Test of Class X (Post–Test)	60
Marks of Class IX (Pre–Test)	49
Aggregate Increase in Marks	11

Figure – 61:

Individual Achievement of Roll No. 70 in Pre–Test and Post–Test



The above figure shows individual achievement of the student in post–test (Class X) as compared to pre–test (Class IX). There is an increase of **eleven** marks after implementation of the programme.

5.7 EFFECTIVENESS OF THE PROGRAMME

To study the effectiveness of programme 't' value was computed based on mean of pre–test and post–test, summary of same has been presented in table 103.

Table – 103:

't' Value for Pre–Test and Post–Test

	(Pre–Test)	(Post–Test)	't'
Number	60	60	28.05
Mean	39.17	61.33	
Standard Deviation	2.89	5.42	

(t=0.01 at df 118 = 2.35)

The mean achievement of pre–test (i.e. achievement in class IX) was 39.17 and that of post–test (i.e. final achievement test) was 61.33. Thus, there is observed difference of 22.16. 't' value was found to be 28.05 which is significant at 0.01 level with 58 degrees of freedom. This clearly indicated the effectiveness of programme as the mean difference was in favour of final achievement test.

5.8 SUGGESTIONS

Research studies in general opened new avenues for further research. The present investigation is not an exception. The following suggestions can be drawn for the students, parents and teachers as well as for further research.

5.8.1 Suggestions for Students, Parents and Teachers

- Students should develop good study habits for preparing the subject mathematics.
- Students should make charts for formulae and make notes for model sums which help them for fast revision and cultivating confidence in the subject.
- Students should create positive attitude towards the subject mathematics and provide positive auto suggestions to the self for getting enthusiasm.

- Students should work daily for two hours over and above the homework given by the teacher. They should not use ready reference material for solving the sums.
- Students should approach the subject teacher for their problems in mathematics and take help and guidance for improving their achievement.
- The students should work hard in geometry and statistics and practice more to prepare theorems, riders and essay type questions with sincere efforts through proper understanding. If needed should take help of the teachers or friends.
- Students should have the attitude to solve each and every type of mathematical puzzles or games and also should take part in quiz competitions.
- Students should have positive attitude towards the subject teacher because negative attitude for teacher can be a hurdle in the study and even also in achievement.
- Mathematics is a calculative subject and one knows "practice makes man perfect" so for day to day life and bright future the students should create interest in mathematics and should work hard daily.
- Students should practice for concentration, relaxation and recalling techniques. Students should even practice a habit of taking alteast six hours sleep daily and particularly at the time of examination.
- Students should try to reduce their stress and fear for examination by cultivating good study habits as well as practicing relaxation techniques like deep breathing and by providing powerful auto suggestions.
- Students should give each and every test by preparing and practicing the subject matter in depth then after test they should check in which topics improvement is needed.
- Students should cultivate a habit of writing neat examples without any overwriting.
- Students should be frank with their subject teachers for their any kind of study problems and should not keep any fear for asking any kind of questions in the classroom or outside the classroom.

- Parents should see that their child should study mathematics daily for two hours, and should see that the child should not copy the sums given in the homework from material in which solved sums are provided.
- Parents should contact the subject teacher of mathematics atleast once a month for knowing the progress report of their child and if child is not working satisfactorily they should take help of the subject teacher and work according to teacher's guideline.
- Parents should study the answer books of the test properly and find out the reasons of low achievement and take necessary steps accordingly.
- Parents should try to utilize the child's potential by providing enthusiasm, motivation, by giving surprise prize at the time of good achievement.
- Parents should take care about their friendship and their attitude towards the subject mathematics and parents should guide the child to make friends who are good at mathematics.
- Parents should spare atleast one to two hours with their child daily and should take interest in their study habits and keep knowledge related to each subject and try to enhance their achievement.
- Parents should provide proper motivation and guidance and try to make their child's attitude positive towards the subject mathematics.
- Parents should explain the importance of the subject mathematics in day to day life and for development.
- Parents should try to reduce examination stress and fear at the time of examination through providing proper guidance and help needed by the child. Parents should take care that child should take sufficient sleep at the time of examination.
- The teachers should identify the areas of mathematics in which the students face difficulty and then should provide them remedial measures in those areas so that their weakness in reference to that area can be rectified.
- Teachers should conduct a test after the completion of each unit and errors committed by students should be identified.
- Teacher should conduct a test in the beginning of each unit to identify the weaknesses of the students in the area which they have already studied.

- Teachers must be aware of various correlates of achievement.
- Teachers should identify the errors committed by students and accordingly remedial programme be organized.
- Teachers should administer the test of basics for entire mathematics course.
- In teacher preparation programme, emphasis be given on situation analysis, error analysis along with factors responsible for low achievement.
- Teachers should provide guidance to the students for better study habits, regular practice for mathematics and also provide needed guidance and remedial teaching.
- Teachers should possess helpful nature and should motivate the lower achievers in mathematics and create positive attitude towards the subject.
- Teachers should use maxim from easy to difficult in teaching–learning process as well as they should teach considering the level of low achievers.
- Teachers should provide proper guidance for homework and for preparing geometry section.
- Teachers should take class test and try to reduce their examination fear and stress.
- Teachers should bring into notice of the students their mathematical weaknesses and also prescribe adequate exercise for better results.

5.8.2 Suggestions for Further Study

- Similar studies can be conducted for other school subjects.
- Similar studies can be conducted for students having less than thirty five marks.
- Based on errors identified, a diagnostic test can be developed.
- Case studies of low achievers as well as high achievers can be conducted.

It is hoped that the present study will not only provide a basis for further research but also give more effective guidelines to solve the problem of low achievers in mathematics by eliminating mathematical weaknesses and enhancing the achievement in mathematics of class X.