PROBLEM FACED BY HIGH SCHOOL STUDENTS IN LEARNING ANALYTICAL GEOMETRY IN MATHEMATICS

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MASTER OF EDUCATION

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DECLARATION

I hereby declare that this dissertation "**PROBLEM FACED BY HIGH SCHOOL STUDENTS IN LEARNING ANALYTICAL GEOMETRY IN MATHEMATICS"** submitted by me for the degree of Master of Education is the result of my original and independent research work carried out under the guidance of **Mr.K.Gireesh Kumar**, Assistant Professor in History, N.V.K.S.D College of Education, Attoor and it has not been submitted elsewhere for the award of any degree , diploma and fellowship of any other university or institution.

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CERTIFICATE

This is to certify that the dissertation entitled "**PROBLEM FACED BY HIGH SCHOOL STUDENTS IN LEARNING ANALYTICAL GEOMETRY IN MATHEMATICS"** submitted for the Master of Education degree by **RAJENDRAN.R** is an original record of research work carried by him under my guidance and supervision. It is further certified that the work is an original one free from any duplication.

Place: Attoor **Mr.K.GIREESH KUMAR**

Date:

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CHAPTER - I

INTRODUCTION AND CONCEPTUAL FRAME WORK

"*Mathematics is though moving in the sphere of complete abstraction from any particular instance of what it is talking about*"

– A.N. White head

Education is an integral part of human life. It is the basic condition for the development of the 'whole man' and vital instrument for accelerating the well-being and prosperity of all in every direction. Without education man should still be living just like a splendid slave or like reasoning savage. Therefore, it is one of those subjects, which are talked about by all.

Throughout the centuries, mathematics is being recognized as one of the central strands of human intellectual activity. From the very beginning, mathematics has been a living and growing intellectual pursuit. The world of today, which learns more and more heavily on science and technology, demands more and more mathematical knowledge on the part of more and more people and the world of tomorrow will make still greater demands on a person to be "well educated" in the technological society of today, and as such he or she should have some degree of mathematical literacy. Though mathematics has been with

us for more than 5000 years, the subject has never been made as lively as it is today. The pace of mathematical discovery and invention has accelerated amazingly during the last few decades. It has been said that mathematics is the only branch of learning in which theories of two thousand years old are still valid.

The dictionary meaning of mathematics is that "it is either the science of number and space or the science of measurement quantity and magnitude".

In fact, the meaning of the word mathematics is- 'The science in which calculations are prime'.

Betrand Russel defined mathematics as the subject in which we never know what we are talking about, nor whether what we are saying is true.

According to National Policy on Education (1986) "Mathematics should be visualized as the vehicle to train a child to think, reason, analyses and articulate logically. Apart from being a specific subject it should be treated as a concomitant to any subject involving analysis and meaning".

In Hindi, Mathematics is known as *'GANITA'* meaning there by 'The science of calculations'.

Comte defined mathematics as "The science of indirect measurement".

According to Kant "Mathematics is the indispensable instrument of all physical researches".

Gauss stated "Mathematics is the queen of sciences and arithmetic is the queen of all mathematics".

Mathematics represents a high level of abstraction attained by the

human mind. In India, mathematics has its roots in vedic literature which is nearly 4000 years old. Between 1000 A.D and 1000 B.C various treaties on mathematics which were set forth for the first time, the concept of zero, the techniques of algebra and algorithm, square root and cube root.

The concept of zero is also originated in ancient India. In ancient India this numeral was used in computation, it was indicated by a dot and was termed *Pujyam.* Even today we use this term for zero along with the more current term '*Shunyam'* meaning blank.

In India around the 5^{th} century A.D. a system of mathematics that made astronomical causation easy was developed. In those times its application was limited to astronomy as its pioneers were astronomers. As trinomial calculations are complex and involve many variables that go into the derivation of unknown quantities. Algebra is a short hand method of calculation and by feature, it scores over conventional arithmetic.

In Ancient India conventional mathematics termed *ganitam* was known before the development of algebra. This is borne out by the name *bijaganitam*, which was given to the algebraic form of computation.

Geometry is a field of mathematics that offers enormous potential for bringing the subject alive. The visual nature of geometry, its rich history and culturally diverse background, and its links with art and design, all provide opportunities to make geometry lessons interesting and stimulating. The potential for exploring mathematical ideas is enormous.

There has been concern about the position of geometry in school

curriculum. The report teaching and learning geometry affirmed the importance of geometry as a branch of mathematics.

It is generally accepted the pupils' appreciation of geometry develops from global recognition of the whole shape to the more analytical understanding of properties and relationships. In other words, pupils can identify a triangle before they can explain what makes it a triangle.

IMPORTANCE OF MATHEMATICS:

A child may encounter learning difficulties in analytical geometry in Mathematics for any of the several reasons. Perhaps he is being careless in his work, or he does not understand the concept or process involved. Remedial possibilities for these kinds of problems are plentiful once the difficulty has been precisely identified.

Another possible cause of child's difficulty is that the mathematics curriculum, including the goals and objectives, which have been planned for him, may not be appropriate for him. In addition to being inappropriate, the mathematics curriculum may not be stimulating to the child, causing him to lose interest. A lack of desire to learn mathematics can cause a child many learning difficulties.

Mathematics is an important subject in school curriculum. It is more closely related to our daily life as compared to other subjects. Except our mother tongue there in no other subject which is more closely related to our daily life

as mathematics. It is considered as father of science. In the present day mathematics has been given an important place in school curriculum. In order to give an important place in curriculum, a particular subject must possess the following views

i. Utility of particular subject in daily life.
ii. The social and cultural importance of particular subject.

Napoleon remarked that "The progress and improvement of mathematics is linked to the prosperity of the state".

AIMS OF TEACHING MATHEMATICS:

Aims of teaching mathematics can be listed below:

i. To enable the students to have clear ideas about number concept.
ii. To give the individual understanding of ideas and operations in number and quantity needed in daily life.
iii. To help the learner in the intelligent use of reasoning power.
iv. To develop constructive imagination and inventive faculties.
v. To develop the character through systematic and orderly habits.

OBJECTIVES OF TEACHING MATHEMATICS:

The objectives of teaching mathematics covered by the aims as stated are as under:

i. To enable the student to solve the mathematical problems of his daily life and to comprehend the contribution of mathematics to society.

ii. To arouse interest in the quantitative side of the world around him and to develop the skills to do simple numerical problems.

iii. To develop the power of logical thinking and the ability to analyze and to generalize.

iv. To promote the power of concentration in students and the ability to estimate weight, distance and size.

v. To enable the students comprehend the significance of different units of measurement, mathematical language and principle concepts, mathematical language and principal concepts.

vi. To develop speed and accuracy in performing arithmetical computations and operations, and to apply the knowledge of mathematics in other disciplines.

vii. To provide opportunities for aesthetic enjoyment, recreation and expression.

viii. To inculcate the habit of working systematically and promote the power of concentration among students.

ix. To prepare the child for the vocation or profession he may choose for himself.

x. To inculcate in child the love for higher mathematics and to prepare him for that.

VALUES OF MATHEMATICS:

Intellectual Values:

Mathematics teaching is very important for intellectual development.

There is no other subject in the curriculum like mathematics which make students brain active. Problem solving helps us in development of mental faculties. Mental work is needed for solving mathematical problem. As a child, faces a mathematical problem his brain becomes active in solving that problem. According to Plato “Mathematics is the subject which provides an opportunity for training the mind, to close thinking, stirring up a sleeping and unstructured spirit”.

Practical values:

Our daily life and behavior is totally dependent on mathematics. We need mathematics in order to classify and to understand every fact. We need its knowledge in our daily routine, house, outside, market, income, expenditure, etc. In the words of Young “whenever we turn in these days of iron, steam and electricity, we find that mathematics has been the pioneer and guarantees the results. When its backbone removed, our material civilization would inevitably collapse”.

Disciplinary values:

Mathematics is not meant by only for development of mental abilities but also to develop their personality with some qualities like concentration, truthfulness, seriousness, etc. That is why the disciplinary value of mathematics is also important. A child judges about his good or bad with the help of his reasoning power, wisdom, patience and self-confidence.

Moral values:

Morality is the important phase of life which is most affected by time,

person, situation and place. Mathematical knowledge is helpful in character and personality development and develops all those qualities in a person of strong character must possess. Child develops qualities of cleanliness, reality, punctuality, loyalty, justice, dutifulness, self-control, self-reliance, self-confidence, patience, and listens to others and respect them, etc., through the study of mathematics.

Social value:

Man is a social animal and human life depends upon the co-operation of each other. In order to live a social life, its knowledge is needed because the give and take process, business and industry depend upon the knowledge of mathematics. The change in the social structure with regards to modern facilities like mode of transport, means of communication and progress in the field of science and technology is due to mathematics. Napoleon has accepted the social value of mathematics and said that, “the progress and improvement of mathematics are linked to the prosperity of the state”.

Cultural values:

The cultural value of mathematics is steadily increasing day by day. J.W.A. Young says “Whenever we turn in these days of iron, steam and electricity we find that mathematics has been the pioneer”.

Aesthetic values:

Mathematics is just like a song, beautiful, an art, music and a means of gaining pleasure for those who studies and likes it. At the moment every child feels pleasure, satisfaction, confidence and self-reliance. Keats has well

remarked that “Truth is beauty”.

If mathematics is considered as the creator and nurturer of all arts then it might not be wrong because in the development of all arts such as drawing, painting, art of sculpture, fine art, music, dance, etc. mathematics plays an important role.

Leibnitz has been also said that “Music is a modern hidden exercise in arithmetic of a mind unconscious of dealing with numbers”.

Vocational values:

The main aim of education is to help the children to earn their living and to make them self-dependent. To achieve such aim mathematics is the most important subject than any other. At present the vocational value of engineering,

technology, management, information technology has become more important and prestigious or reputed.

Psychological values:

Mathematics education is also useful from the point of view of psychological aspects. Mathematics fulfills the psychological needs of the children. In mathematics emphasis is given on operation and drill work so that its knowledge becomes more solid as well as durable. The teaching of mathematics follows the various laws and principles of psychology. Through its knowledge the child develops and satisfies his desires, creative and constructive tendencies, self-satisfaction, etc.

International values:

Mathematics not only gives the knowledge about the nation and its background but also gives a message of nationality. The progress in the field of mathematics is neither the achievement of a single person, nation, society, cast or religion follows only nor it is the property of a particular nation. Any invention of a nation when crosses its boundaries, it reaches to its international value. This is the reason of the progress in the field of science and mathematics.

PLACE OF MATHEMATICS IN SCHOOL CURRICULUM:

Mathematics curriculum forms an important part of the school curriculum. The Indian Education Commission (1966) emphasized the importance of mathematics in the school curriculum in view of the importance of qualification and the advent of automation and cybernetics in the scientific and industrial revolution. Mathematics curriculum comprises all those systematically planned activities carried out by the student individually or in group. Plato advocated the inclusion of mathematics in the school education because mathematical reasoning disciplines the mind. He wrote over the portals of his academy ‘Let no one ignorant of geometry enters here’.

Mathematics as Compulsory Subject:

There are contradicting views regarding the inclusion of mathematics as compulsory subject in the school curriculum raise their objection on the following grounds:

i. Mathematics is mainly taught for its disciplinary value in the hands of an able and resourceful teacher, Teaching of any subject can help in training the mental faculties of the students and hence there is no need to make the learning of mathematics for the sake of disciplinary value.

ii. Learning of mathematics requires special aptitude and favorable disposition. Therefore it is not fair to make the students who have neither aptitude nor interest, to learn the subject.

iii. Learning of mathematics needs special mathematical ability for successful performance in the subject. Not at all students have the mathematical ability to learn the subject and hence it can be made an optional subject.

iv. Mathematics forms the basis for higher education in mathematics and for many other professional courses.

v. Mathematics is a very tough subject and the learning of mathematics is boring and disinteresting. Compulsory learning of such a subject can affect the students' attitude towards schooling and performance in other subjects.

Problems in learning Analytical Geometry in Mathematics:

A child may be suspected of having a learning disability in mathematics and might be found to have one of the following problems.

i. Difficulty with size and spatial relationship.
ii. Confusion of left-right and inversion of symbols.
iii. Problems with language symbols.
iv. Difficulties shifting from one response to another relative to different learning task requirements.
v. Difficulty with reasoning, problem solving, diagrammatic representation, theorems and proves, and concept formation.
vi. Learning of mathematics needs special mathematical ability for successful performance in the subject. Not at all students have the mathematical ability to learn the subject and hence it can be made an optional subject.
vii. Mathematics forms the basis for higher education in mathematics and for many other professional courses.
viii. Mathematics is a very tough subject and the learning of mathematics is boring and disinteresting.

NEED AND SIGNIFICANCE OF THE STUDY:

Mathematics like anything else that man has created exists to fulfill certain human needs and desires. It is very difficult to say at what point of time in the history of mankind and in which part of the world, mathematics had its

birth. The fact that it has been steadily pursued for so many centuries, that it has attracted ever increasing attention and that it is the dominant intellectual interest of mankind shows that it appeals very powerfully to him. The knowledge of mathematics is useful to understand and interpret matters in numerical form and understand various phases. Mathematical growth has been in area such as operational research, linear programming, system analysis, all involving process to handle numeral information in an increasingly technologically advanced world. The mathematical idea we teach in schools develop over many years of study and become associated in our minds with all the applications and illustrations.

The teaching and learning of mathematics have been a major concern in education. Various commissions and committees have laid great emphasis on raising the quality of instruction in mathematics. It teaches how to analyses a situation, come to a decision and to check thinking and its results.

Analytical Geometry is an important component of mathematics and is considered as a difficult and mysterious aspect of mathematics because of the numerous symbols which it employs. Many students find it difficulty in this topic because it employs various diagrammatic representation, problem solving, theorems and proofs, and concept formation which are very difficult to learn and understand. Usually the average score in analytical geometry in a school or college will be low and the achievement scores in analytical geometry in mathematics are very poor. It is a well-established fact that in no

subject matter areas, high school students suffered more from erratic difficulties and lack of guidance than in the field of analytical geometry. In the present study, the investigator tries to analyze the problems faced by high school students in learning analytical geometry in mathematics.

STATEMENT OF PROBLEM:

The research problem is entitled as 'PROBLEMS FACED BY HIGH SCHOOL STUDENTS IN LEARNING ANALYTICAL GEOMETRY IN MATHEMATICS'.

OPERATIONAL DEFINITION OF THE TERMS:

Problems:

Problems refer to the questions to be solved. Here the researcher wants to find out the problems faced by high school students in learning analytical geometry in mathematics.

High school students:

High school students refer to the students studying in ninth and tenth standard in different schools of central and state board of education on regular stream**.**

Analytical geometry in Mathematics:

Analytical Geometry studied by identifying points with pairs of real number (plane analytic geometry) or with triples of real numbers (solid analytic

geometry), using coordinate axis, it is then possible to represent lines, planes, circles with equations and prove theorems by algebraic computations.

OBJECTIVES OF THE STUDY:

1. To construct and validate a tool to measure the problems faced by high school students in learning analytical geometry in mathematics.
2. To identify the problems faced by high school students in learning analytical geometry in mathematics.
3. To identify the problems faced by high school students in learning analytical geometry in mathematics with respect to
    a) Problem Solving
    b) Diagrammatic Representation
    c) Theorems and Proofs
    d) Concept Formation
4. To find out whether there exist any significant difference in the problems of high school students in learning analytical geometry in mathematics based on
        a) Gender
        b) Locality
        c) Type of School
        d) Educational Qualification of father
        e) Educational Qualification of mother

HYPOTHESES:

1. There is no significant difference in the mean scores of male and female high school students on their problems in learning analytical geometry in mathematics.
2. There is no significant difference in the mean scores of male and female high school students on their problems in learning analytical geometry in mathematics based on:
    a) Problem Solving
    b) Diagrammatic Representation
    c) Theorems and Proofs
    d) Concept Formation
3. There is no significant difference in the mean scores of rural and urban high school students on their problems in learning analytical geometry in mathematics.
4. There is no significant difference in the mean scores of rural and urban high school students on their problems in learning analytical geometry in mathematics based on :

a) Problem Solving

b) Diagrammatic Representation

c) Theorems and Proofs

d) Concept Formation

5. There is no significant difference in the mean scores of problems in learning analytical geometry in mathematics among high school students based on type of school.
6. There is no significant difference in the mean scores of problems in learning analytical geometry in mathematics among high school students based on type of school with respect to:
    a) Problem Solving
    b) Diagrammatic Representation
    c) Theorems and Proofs
    d) Concept Formation
7. There is no significant difference in the mean scores of problems in learning analytical geometry in mathematics among high school students based on educational qualification of father.
8. There is no significant difference in the mean scores of problems in learning analytical geometry in mathematics among high school students based on educational qualification of father with respect to:
    a) Problem Solving
    b) Diagrammatic Representation
    c) Theorems and Proofs
    d) Concept Formation
9. There is no significant difference in the mean scores of problems in learning analytical geometry in mathematics among high school students based on educational qualification of mother.

10. There is no significant difference in the mean scores of problems in learning analytical geometry in mathematics among high school students based on educational qualification of mother with respect to:
    a) Problem Solving
    b) Diagrammatic Representation
    c) Theorems and Proofs
    d) Concept Formation

METHODOLOGY IN BRIEF:

Method:

The method adopted for the present study was normative survey method.

Sample:

The study was conducted on a sample of 400 high school students studying in different schools of Kanyakumari district.

Tools used for the study:

For the present study the following tools were used

1. Questionnaire prepared based on problems in learning analytical geometry in Mathematics by the investigator (R.Rajendran and Mr..K.Gireesh Kumar,2014)
2. Personal data sheet.

Statistical Techniques used for the study:

For the present study the following statistical techniques were used

1. Arithmetic Mean
2. Percentage
3. t- test (test of significance)
4. ANOVA- Analysis of variance

DELIMITATIONS:

The main limitations of the study are following

1. The questionnaire was used as the main tool for the study of the problem faced in learning which has its own limitations.
2. The sample size was limited to 400 students only.
3. Only four dimensions from the analytical geometry in a content part were select for the study.

ORGANIZATION OF THE REPORT:

Chapter-I

It contains the conceptual framework, need and significance of the present study, statement of the problem, definitions of terms used, objectives and hypotheses of the study, statistical techniques and delimitations of the study.

Chapter-II

It contains need for the review, significance of review, purpose of review, role of related literature, studies related to India and abroad and a critical overview.

Chapter-III

It describes introduction of research methodology, test development and plan and procedure adopted for the study.

Chapter-IV

This chapter deals with analyses and interpretation of the data collected for the study.

Chapter-V

It contains findings, conclusion, educational implication and suggestions for further research in the field of the study.

CHAPTER-II

REVIEW OF RELATED LITERATURE

- **Introduction**
- **Classification**
    a) **Studies conducted in India**
    b) **Studies conducted in abroad**
- **Critical overview**

CHAPTER – II

REVIEW OF THE RELATED LITERATURE

Review of related literature plays a very important role in conducting a research. In research methodology the team literature refers to the knowledge of the particular area of in investigation of any discipline, which includes theoretical, practical and research studies. The term ‘review’ means to organize the knowledge of a specific area of research, to evolve an edifice of knowledge, to show that the particular study would be an addition to the field.

Need for the Review:

The review of related literature is an important aspect and essential pre-requisite of any investigation. One of the early steps in planning a research work is to review the research. It is very essential in the information provided. It avoids the replication of the study and it finds to take an advantage from similar of related literature indicates the clear picture of the problem to be solved.

To assess the level of theory and research that have been developed in the field of study, to find what is already known and what remains to be investigated in the specific field of study.

i. To understand the definition of the establish concept and variables in the chosen field

ii. To identify and adopt the research design, analytical methods, scales, instruments, data analysis, etc...

iii. To become fully aware of all the difficulties encountered by other workers and thus avoid waste of time and money in the proposed research.

iv. To learn how to write a research report.

Importance of the review of related literature:

The review of related literature serves the following purpose:

i. It enables the researches to define the limits of his field. It helps to delimit and define his problems.

ii. Review of literature gives the scholar an understanding of previous work that has been done.

iii. It gives an understanding of the research methodology which refers to the study is to be conducted.

iv. It furnishes the researcher with dispensable suggestion about comparative data, good procedures, likely method and field techniques.

v. It prevents pointless repetition of research.

Purpose of the review:

Review of the related literature besides allowing the researcher to acquaints him with current knowledge in the field or area in which he is going to conduct his research, serves the following specific purposes:

i. The review of related literature enables the researcher to define the limits of his fields
ii. By reviewing the related literature the researcher can avoid unfruitful and useless problem areas. He can related those areas in which positive findings are very, likely to result and his endeavours would be likely to add to the knowledge in a meaningful way.
iii. Though the review of related literature the research can avoid unintentional duplication of well-established finding.
iv. The review of related literature gives the researcher an understanding of the research methodology which refers to the way of studies.
v. The review of related literature is to know about the recommendations of previous researches listed in their studies for further research.

Role of related literature:

i. Knowledge of related literature enables investigators to define the frontiers of their field.

ii. A thorough review of related theory and research enables researchers to place their questions in perspective.

iii. Reviewing literature helps researchers to limit their question and to clarify and define the concepts of the study.

iv. A critical review of related literature often leads to insight into the reasons for contradictory results in an area.

v. Through studying related research, investigators land which methodologies have proved useful and which seem less promising

vi. A thorough search through related research avoids unintentional replication of previous studies

vii. The study if related literature places researches in a better position to interpret the significance of their own result.

STUDIES CONDUCTED IN INDIA

1. Narayanan and Nandini (2014) conducted a study on "Language learning problems in Marathi: design and evaluation of a classroom intervention programme". The sample compressed of 120 fourth grade students from a government, aided school in Chinchwad, Pune. The main objectives of the study were: To design a classroom intervention programme in Marathi for learning problems and learning disability. To assess the effectiveness of the intervention programme in terms of (a) improvement of student's performance and (b) feasibility of classroom implementation. The major findings of the study were that the individual differences were found in the

children's performance in information processing as well as language skills of reading, writing, comprehension and oral expression.

2. Suni (2013) conducted a study on "Learning difficulties and Achievement in Chemistry of XI standard students". The sample consisted of 400 XI standard students. The investigator used the personal data sheet and achievement test. The tools identified learning difficulties and achievement in Chemistry of XI standard students. The major objective of the study was to assess the ability of learning chemistry. The major finding of the study was that there was no significant difference in the mean scores of Chemistry of XI standard rural and urban students in their level of learning difficulty.
3. Shirley (2012) conducted a study on "Problems of high school science teachers in teaching learning process". The sample consisted of 149 high school science teachers. The investigator used by the tool problem inventory. The major findings of the study were: The problems faced by high school science teachers independent of gender, educational qualification and their teaching experience.
4. Babu and Mummoorthy (2012) conducted a study on "Problems faced by higher secondary students in relation to family environment". The sample consisted of 900 higher secondary students. The investigator used the tools namely the family environment scale which was constructed and validated by Harpreet Bhatia and Chadah. The major findings of the study were: There was no significant difference between the male and female higher secondary students in respect of their family environment

5. Kingsly (2012) conducted a study on “Learning difficulties of higher secondary students in Physics”. The investigator used random sampling technique. The investigator randomly selected 300 students who were studying XI and XII standard. The main objective of the study was to find out the problem of higher secondary students in learning Physics. The major findings were: Learning difficulties are more in rural compared with urban. The learning difficulties may impede the academic proficiency of the higher secondary students in Physics who may have strong desire to lead their profession of interest.
6. Mummoorthy (2011) conducted a study on “Problem faced by high school students in learning Chemistry”. The sample consisted of 500 XI standard students. The investigator used the tools problem inventory. The main objectives of the study were to find out where there exists any significant difference between XI and XII standard students in terms of learning their sex level. The major finding of the study was that there is no significant difference between the higher secondary students from the urban area and in the rural area.
7. Samuel raj (2010) conducted a study on gender differences in mathematical problem solving. The objective of the study was to know the effectiveness of the conventional method in developing problem solving skills and to differentiate the problem solving skills of male and female students when exposed to sheuristic method. The findings of the study revealed that there

is significant difference in the performance of male and female in their problem solving test taught through conventional method.

8. Reddy (2009) conducted a study on “Problems faced by teachers in teaching History”. The main objectives were: To find out the problem of teaching new X standard students history syllabus and to find out the difficulty of all topics included in the X standard new social studies history syllabus as perceived by social studies teachers. The major finding of the study was that the study stipulations of certain topics are recommended to defect from the X standard social studies textbook.
9. Raphael (2008) conducted a study on “Problems faced by the students and teachers of IX standard due to the implementation of environment education “. The main objective was to find out the problems faced by the student and teacher in teaching learning process of environment education. The major finding was that there are many problems faced by the students as well as the teachers in the teaching learning process.
10. Sobhani and Kahn (2007) conducted a study on “Problems faced by male medical students in learning of female students”. The objectives of the study were to study the role of teachers in improving relationship between the student and patients,ant to study the influence of sex on gaining confidence of patients. To study the effects of patients education on treatment. The major findings of the study was that by cleaning the misconception in the mind of the patients, teacher can play a pivotal role in

improving relationship between students and patients. Education of the patient enhances the early intervention.

11. Nisha (2007) conducted a study on “Learning difficulties in social studies among secondary school students”. The sample consisted of 400 students studying in secondary schools. The investigator used the tool namely learning difficulty questionnaire prepared by the investigator and general data sheet. The major findings of the study were: There is significant difference between urban and rural students of secondary school in their learning difficulties in social studies.
12. Reddy (2006) conducted a study on” Identification and assessment of second language learning difficulties among higher secondary students”. The objective of the study was to identify and assess language learning difficulties in second language acquisition. To develop diagnostic tools. The major finding of the study was that curriculum based and teacher made diagnostic tools are valuable. Diagnostic tools are applicable in classroom.
13. Kala (2005) conducted a study on “Problems faced by high school students in learning mathematics”. The sample consisted of 400 high school students. The objectives of the study were: To construct an instrument to find out the problems faced by high school students in learning mathematics and to measure the level of problems faced by high school students in (a) Content, (b)Teaching, (c) Examination, (d) Learning and (e) Subject. To investigate the differences, if any, between male and females on their problems in (a) Content, (b) Teaching, (c) Examination, (d) Learning and

(e) Subject. The major findings of the study were that there is significance difference between male and female , rural and urban students in their problems. It was found that 30% students have problems in content, 50% have problems in teaching, 48% have problems in examination, 62% have problems in learning and 28% have problems in subject.

STUDIES CONDUCTED ABROAD

14. Bernard (2011) conducted a study on "Investigating the effects of a combined problem solving strategy for students with learning difficulties in Mathematics". The instructional method used in these lessons combined the use of teacher – directed explicit instruction, a graduated word problem sequence, schema based diagrams, the concrete representational abstract sequence and the use of a mathematics word problem strategy. The major finding of the study was that students with mathematics disabilities improved their abilities to solve mathematical word problems after receiving the combined problem solving strategy.
15. Ryan (2011) conducted a study on "Exploring cognitive profiles of children with learning disabilities". The major objectives of the study were to determine whether identifiable differences exist between the cognitive profiles of students diagnosed with reading difficulty and mathematics disability. The major finding of the study was that the discrepant and non-discrepant learning difficulty groups could not be distinguished by the WISC – IV Working Memory Index. To find out amongst the overall sample of students with learning difficulties, those with average or above

working memory scores could be differentiated from those with below average working memory scores on the WISC – IV Perceptual Reasoning Index.

16. Hodges (2011) conducted a study on "A study of problem based learning content acquisition and academic achievement in career and technical education courses at the middle school level". The study, sample consisted of twenty seventh grade students enrolled in a CTE keyboarding class and two certified CTE teachers. The control group learned spread sheet concepts using traditional methods and the treatment group learned spreadsheet concepts using problem based learning strategies. There was no significant difference between male and female students in problem based learning content acquisition and academic achievement in career.
17. Jean (2010) conducted a study on "Foreign language learning disabilities: An activity theory perspective of three middle school students". The major objectives of the study was to contributes to the existing literature on the foreign language learning of students with LLDS by conducting a comprehensive investigation of the performance of three middle school students. The major finding of the study was that there exists significant difference between students and teachers perception.
18. Kimberly (2010) conducted a study on "The experiences of English language learners with disabilities: A comparative study". Research methodology consisted of an in-depth case study analysis of two students of Hispanic descent who attend a rural elementary school is North Carolina.

Results of the study showed that teachers overall that have not received appropriate or adequate training on how to meet the needs of students learning English as a second language. Findings from this study supported that parents are operating in a best of their knowledge but need additional support and teaching so that they understand how to support the education of their child in first and/ or second language at home.

19. Winn (2010) conducted a study on "All kinds of minds: A phenomenological study of adult learners living with learning disabilities". Through a purposeful sampling method, six participants were chosen to participate in recorded interviews in which they described their learning experiences. The findings reveals the consequences of labeling and it shows the difficulty of the emotional side of the experience. It brings out the importance of context within the experience and marginalization and finally, it sheds light on the experience of reframing and redefining self.
20. Netto (2006) conducted a study on "Problems faced by non-English graduate teachers at higher secondary school level". The objectives of the study were: Collecting information about the educational qualification and training in English teaching methodology of teachers in higher secondary school. Studying the English language proficiency teacher-trainee of various subjects. The major findings of the study were: Teachers of English who has graduates in other subjects are not adequately trained in the methodology of teaching English.

21. Douglas (2005) conducted a study on “Teacher perception on the learning difficulties and development of English language skills among high school students influence of classroom teaching and workbooks”. The main objectives of this study was to find out the learning difficulties and the development of English language skills in secondary school students. The study on influence of workbooks in the development of English language skills. The major findings of this study was there was significant difference among the teachers working in English medium students on the overall development of English language in the students. The learning difficulties are more in English medium students.
22. Desoete (2004) conducted a study on “Children’s with mathematics learning difficulties in begin”. The objective of this study was to study mathematical difficulty to Belgian third grade students. The major finding of this study was that Belgian third grade student’s shows mathematical ability. By providing word problem task they can improve their mathematical ability.
23. Kaino (2003) conducted a study on “The problem of gender differentials in mathematics in Botswana Junior Secondary Schools by identifying three themes forming the major areas of concern for mathematics”. These are student’s interest in learning mathematics, feelings in mathematics class and interactions in a mathematics class. There is no significant differences in interest for mathematics between girls and boys, skill others felt that they “needed more help in mathematics learning and others did not consider

mathematics to be in their future careers". He reports that boys felt more comfortable in mathematics classes while girls were more worried.

24. Key and Yeo (2003) conducted a study on "Mathematical difficulties that an often shown by dyslexic pupils". The objectives of the study were: To investigate the effects of using dyslexic pupils. The major findings of this study were: Dyslexic pupils have difficulty with long term memory for facts working memory difficulties, sequencing difficulties in mathematical language.
25. Arena (2001) conducted a study on "Problems of XII students in learning Physics". The main objectives of the study were: To study the problem of XI and XII students in learning physics. To find out there exists any significant difference between XI and XII standard students in terms of learning their sex level. The major findings of the study were: The Tamil Nadu English medium students significantly differ in the mean scores of problem in diagrams. There was significant relationship between learning and achievement of the Tamil medium students both boys and girls.

CRITICAL REVIEW

The investigator reviewed twenty five studies totally, out of which thirteen were Indian studies and twelve were foreign studies. Almost all the studies revealed that low, moderate and high level of problems were faced in the variables selected. These studies have helped the investigator to locate and compare data useful for interpretation of results for their studies. It also provided ideas, theories and explanations.

CHAPTER-III

METHODOLOGY

- **Introduction**
- **Test development**
- **Plan and procedure**
- **Statistical techniques used**

CHAPTER - III

METHODOLOGY

Research methods are basically concerned with observation of reality, defining the problem and its dimension, a planned approach towards analysis of the problem, interpretation of information and drawing conclusions. Through this process a researcher attempts to acquire an understanding of the problem and make concrete suggestions towards its solution. The success depends upon sensitivity power of observation, logical thinking process and ability to draw conclusions by assimilating a large mass of information.

Research is most essential and powerful tool for the progress of the democratic society. Without research, development in various spheres of life and law would not have been possible. Research is more systematic activity that is instructed towards discovery of various facts of an organized society.

Research leads towards information and knowledge. It eradicates ignorance and candle the light to find the truth against all bias. Research helps to find solution for innumerable legal problems of life. It is based on experience with empirical evidence. Research rejects dogmas and answers by making accurate observation. It is a quest to answer unsolved question by

pushing back the hurdles of ignorance. It is based on courage and confidence. It is carried with patience and finds spectacular result against disappointment and anarchy. It carefully records and reports the finding in scholarly manner. The researcher makes rigorous exercise and shuns pain to remove superficial legal concepts.

According to Encyclopedia Britannica- research means "The act of searching into a matter closely and carefully, inquiry directed to the discovery of truth and in particular the trained scientific investigation of the principles and facts of any subject, based on original and first hand study of authorities or experiment".

Webster's International Dictionary defines- research is "a careful, critical inquiry or explanation in seeking facts or principles, diligent investigation in order to ascertain something".

According to J.W. Best and J.V. Kahn "Research may be defined as systematic and objective analysis and recording of controlled observation that may lead to the development of generalization, principles or theories, resulting in prediction and possibly ultimate control of events".

This chapter is divided into two major sections.

Section – A: Test Development

Section – B: Plan and procedure

SECTION – A

TEST DEVELOPMENT

One of the important steps in any research is the collection of relevant data. For this, an appropriate tool is essential and a readymade tool may not work suitably in all researchers. In such cases the investigator has to prepare suitable tools for the study.

The tool for the present study, prepared by R. Rajendran and K. Gireesh Kumar (2014) meant to find out the problem faced by high school students in learning analytical geometry in mathematics. The major steps followed in construction of this tool are,

1. Planning of the test
2. Item Writing
3. Item Editing
4. Arrangement of Items
5. Preliminary tryout
6. Draft form of the test
7. Final tryout
8. Scoring
9. Item Analysis
10. Item Selection
11. Format of the final scale
12. Establishing reliability and validity of the test

1. Planning of the Test:

The tool for the present study prepared by R.Rajendran and K.Gireesh Kumar (2014) aims at measuring the problems in learning analytical geometry in Mathematics based on problem solving, diagrammatic representation, theorems and proofs, and concept formation among high school students

2. Item Writing:

Writing of suitable item is one of the important steps in the construction of any research tool. After a thorough and careful study of the literature available on the problems in learning Analytical geometry in Mathematics by high school students, the investigator referred the required relevant sources on different aspects of problems in learning analytical geometry in mathematics and prepared a large number of positive and negative items. The method used in item writing was the fixed response method. The respondent selected one response out of the two given responses.

The dimensions related to the questionnaire were as follows:

a) Problem solving

b) Diagrammatic Representation

c) Theorems and Proofs

d) Concept Formation

3. Item Editing:

Editing the items needs much care and it is the process of checking and scrutinizing items. The items were referred to the experts for suggestion and modification. As per the suggestion, the ambiguous items were rewritten in simple and meaningful language.

4. Item Arrangement:

All the items in the prepared tools were grouped, ordered and located in a random manner in order to arouse interest and to maintain attention for responding among the students.

5. Preliminary Try Out:

The preliminary tryout of the test was arranged to find out the weakness and workability of the items. The difficulties in responding the items and a rough of the time-limit for responding the items were noted. This step helped the investigator to modify certain items which were vague and questionable. For this purpose the test was given to 400 high school students.

6. Draft Form of the Test:

The first draft was prepared by printing the items with the provision to mark responses. It was printed both in English and Tamil. Necessary

instructions for the respondents were also printed. A sample copy of the draft form of the test is given as **Appendix-B.**

7. Final Tryout:

The tool was administered to a sample of four hundred high school students of various schools in kanyakumari district. Sample copy of the final form of the test is given **Appendix-C.**

8. Scoring:

The collected response sheets were scored with the help of a scoring key prepared by the investigator. The response Sheets were scored by assigning a score of one for positive response and zero for negative responses.

9. Item Analysis:

Item analysis is an important step in a test construction. Item can be analyzed qualitatively in terms of their content and quantitatively in terms of their statistical properties.

Qualitative analysis includes the consideration of content validity and the evaluation of item in terms of effective item writing procedures. Quantitative analysis on other hand includes the measurement of item difficulty and item discrimination power. Both the variability of any test depends ultimately on the characteristics of its items. High reliability and validity can be built into a test is advance through item analysis.

The method of item analysis used in the case of present investigation is one developed by Mathew (1982) called the "Mathew Item Analysis Table". This table gives item criterion correlation and percentages of test, making the key answer. One of the advantages of phi- coefficient is that any convenient tail proportion can be made use of in order to use the same table. It is recommended regardless of the sample sizes.

The response sheets were arranged in the order of the criterion score. The criterion score in the total sheets having the highest criterion were taken and it constitutes the upper tail. Similarly hundred response sheets having the lowest scores were taken forming the lower tail.

The final percentage needed for reading the item indices from the tables are the following.

P_L: Percentage of individual in the lower tail marking the keyed answer.

P_U: Percentage of individual in the upper tail marking the keyed answer.

In the "Mathew Item Analysis Table" all indices for the same value of the P_L have been grouped together. So in order to read the indices for the same value item, the P_L value of the given item was located first them in that session the P_U value of the items along the left margin was located and the corresponding Phi and P values were read. Whenever the P_L value was larger than the P_U value, P_L and P_U values

were interchanged while reading the indices and then a negative sign was attached.

10. Item Selection:

From the item having higher correlation values (phi-value above 0.23) the required numbers of items were selected. The special future about the 'phi' value is that since 'phi' values tend to be high for items having medium 'p' value selection based on 'phi' value alone would give the desired result. Items with (phi value below 0.13) the level of significance is not considered usually.

When 'phi' values of most items were high and a number of items larger, items with some spread of 'p' values would be described. It may be maintained here that 'phi' values were computed for every combination of P_L and P_U values by means of Guilford (1954) formula.

11. Format of the final inventory:

The final inventory consists of total 48 items with almost in simple and meaningful way. A copy of the final inventory is attached in **Appendix – C.**

Details of the items selected based on Mathew Item Analysis are given below.

Table – 3.1

Section – A

Item	P_L	P_U	Phi	P	Selected Items
1	94	90	0.07	92	-
2	15	24	0.11	20	-
3	61	90	0.34	76	Selected 1
4	18	68	0.51	43	Selected 2
5	89	84	0.07	87	-
6	37	64	0.27	51	Selected 3
7	74	87	0.16	81	-
8	33	68	0.35	51	-
9	50	77	0.28	64	Selected 4
10	30	57	0.27	44	Selected 5
11	68	88	0.24	78	Selected 6
12	26	66	0.40	46	Selected 7
13	81	91	0.14	86	-
14	35	70	0.35	53	-
15	48	82	0.36	65	Selected 8
16	27	49	0.23	38	Selected 9
17	55	82	0.29	69	Selected 10
18	27	72	0.45	50	Selected 11
19	57	82	0.27	70	Selected 12
20	14	24	0.13	19	-

Section – B

Item	P_L	P_U	Phi	P	Selected Items
1	75	98	0.34	87	-
2	31	76	0.45	54	-
3	53	83	0.32	68	Selected 1
4	50	78	0.29	64	Selected 2
5	63	94	0.38	79	-
6	37	72	0.35	55	-
7	61	79	0.20	70	Selected 3
8	27	62	0.35	45	Selected 4
9	56	87	0.34	72	-
10	36	64	0.28	50	-
11	56	85	0.32	71	Selected 5
12	34	72	0.38	53	Selected 6
13	70	92	0.28	81	-
14	28	63	0.35	46	-
15	53	87	0.37	70	Selected 7
16	26	53	0.28	40	Selected 8
17	53	83	0.32	68	Selected 9
18	25	70	0.45	48	Selected 10
19	52	86	0.37	69	Selected 11
20	23	71	0.48	47	Selected 12

Section – C

Item	P_L	P_U	Phi	P	Selected Items
1	73	93	0.27	83	-
2	26	70	0.44	48	-
3	68	85	0.20	77	-
4	38	72	0.34	55	-
5	53	86	0.36	70	Selected 1
6	31	69	0.38	50	Selected 2
7	61	92	0.37	77	-
8	31	63	0.32	47	Selected 3
9	55	81	0.28	68	Selected 4
10	9	46	0.41	28	Selected 5
11	49	86	0.40	68	Selected 6
12	19	70	0.51	45	Selected 7
13	51	63	0.12	57	-
14	31	72	0.41	52	-
15	57	83	0.28	70	Selected 8
16	30	59	0.29	45	Selected 9
17	48	74	0.27	61	Selected 10
18	11	53	0.45	32	Selected 11
19	42	84	0.44	63	Selected 12
20	22	65	0.43	44	-

Section – D

Item	P_L	P_U	Phi	P	Selected Items
1	66	78	0.13	72	-
2	37	69	0.32	53	-
3	49	73	0.25	61	Selected 1
4	29	61	0.32	45	-
5	67	83	0.19	75	-
6	22	60	0.39	41	Selected 2
7	55	77	0.23	66	Selected 3
8	26	53	0.28	40	Selected 4
9	55	78	0.24	67	Selected 5
10	27	53	0.27	40	Selected 6
11	51	71	0.21	61	Selected 7
12	20	55	0.36	38	Selected 8
13	51	70	0.19	61	Selected 9
14	24	52	0.29	38	-
15	53	68	0.15	61	-
16	34	57	0.23	46	-
17	57	75	0.19	66	-
18	19	51	0.34	35	Selected 10
19	48	67	0.19	58	Selected 11
20	30	51	0.21	41	Selected 12

- item rejected

Total items – 80

Selected items – 48

12. Establishing reliability and validity of the test :

i. Reliability of the test:

Reliability is the accuracy or precision of measuring instrument.

According to John W. Best (1978) “A test is reliable to the extent that it measures accurately and consistently from one another”.

Reliability is the consistency of scores obtained by the same individual of different occasion or with different set of equivalence method.

In the present investigation, the reliability co-efficient was found out by split-half method. It measures the degree of homogeneity of items. The reliability co-efficient of the test is calculated using Spearman Brown Prophecy formula, found to be 0.9658 showing satisfactory reliability (N=100).

Table – 3.2

Reliability Analysis

Number of sample	100
Number of items	48
Correlation between odd half and even half	0.9339
Reliability coefficient	0.9658

This reveals that the present tool possess high degree of reliability.

ii. Validity of the test:

A test is valid when it meets the purpose for which it was designed. The two main types of validity established for this tool were face validity and content validity.

a. Face Validity:

Face means that the given tool appears or seems to measure what it is to measure. The tool was submitted to a panel of experts and in their opinion it appeared to measure the objective of the tool. A close look on the items of the inventory reveals that each and every item is capable of reflecting the subjects' problem faced by high school students in learning analytical geometry in mathematics. This provided face validity for the tool.

b. Content Validity:

Content validity of the test was also established by verifying the comprehensiveness of coverage of the content of the test using authentic literature and opinion of experts on the basis of the experts from relevant field that the tool has sufficient coverage of its contents.

The decision about the method to be employed always depends on the nature of the problem. A researcher should have a thorough understanding of all research methods, with particular reference to their strength, limitations, appropriateness and applicability.

SECTION – B

PLAN AND PROCEDURE

Method used in the study:

Research is a process of which person observes the phenomena again and again, collects the data and on the basis of data he draws some conclusions. According to Monroe "The final purposes of educational research is to ascertain principles and develop procedure in the field of education". Research methodology is a way to systematically solve the research problem. It is needed to understand the assumption underlying various techniques and they need to know the criteria by which they can decide that certain techniques and procedures will be applied to certain problems.

Different methods are used for conducting research. Important methods are historical method, normative method and experimental method and so on. Based on the nature of the present problem the investigator has decided to use survey as the chief method.

Normative Survey Method:

The term 'normative survey' is generally used for the type of research which proposes to ascertain what is normal or typical at present time. The normative survey method of educational research is very common.

It is a method of investigation which attempt to describe and interpret what exists at present in the form of conditions, practices, processes, trends,

attitudes, beliefs, etc. It is concerned with the phenomena that are typical of the normal conditions.

Purpose of survey:

It provides necessary information which helps, the administrator for making decisions.

i. It suggests the course for future developments.
ii. It surveys as a stepping stone to more precise investigation.
iii. It is useful in the development of research tools such as questionnaires, checklists and opinionnaries.
iv. It secures historical perspective through a series of cross sectional picture of similar conditions at different times.

Characteristics of Normative Survey Method:

i. It gathers data from a relatively large number of cases.
ii. It is essentially cross sectional.
iii. It is not concerned with the characteristics of the individual, but with generalized statistics of the whole population.
iv. Survey method may be qualitative or quantitative.
v. It requires logical and skillful reporting of the findings.
vi. It requires careful analysis and interpretation of data gathered.
vii. It requires expert imaginative planning.
viii. It is more reliable.
ix. It determines the present trends and solves current problems.

Tools Used:

For collecting data required for the study on the problem one way have to use various scientific devices for gathering facts related to the study. These devices are called tools. A great variety of research tools are widely employed for collecting relevant data. The selection of suitable tool is a necessary condition for any successful research. The investigator depending on the nature of study used the following tools for data collection.

(a) Questionnaire

To study the problems faced by high school students in learning analytical geometry in mathematics prepared by investigator.

(b) General Information Sheet

(a) Questionnaire:

For measuring the problems faced by students in learning Analytical Geometry in Mathematics, a tool was developed by the investigator. A draft form of specimen copy of the questionnaire is given in **Appendix –B.**

The questionnaires prepared by the investigator are simple and seek responses in the form of 'Yes' or 'No'. A high score on the test indicates the high levels of problems are faced by the students and low score indicates low level of problem faced by the student in learning analytical geometry in mathematics. The test consists of 48 items, totally. The medium of the test was

in English and a Tamil translation as also provided for easy responding of the subject.

The questionnaire consists of four dimensions of Analytical Geometry in Mathematics namely,

a) Problem Solving
b) Diagrammatic Representation
c) Theorems and Proofs
d) Concept Formation

(b) General Information Sheet:

General information sheet is prepared to collect data regarding personal details such as Gender, Locality, Educational qualification of father and Educational qualification of mother. A specimen copy of the same is given in **Appendix-B.**

THE POPULATION AND SAMPLE:

The small proportion of a population selected for observation and analysis is called the sample. A sample reflects the characteristics, which it is selected. Educational research is done generally on a large size of population. So it is necessary to select a sample in order to generalize for the population.

Sample:

The sample of the present study consisted on 400 high school students studying in various schools in Kanyakumari District. The investigator has

adopted simple random sampling method. While selecting the subjects due representations were given to factors such as gender, locality, type of school, educational qualification of father and educational qualification of mother.

Scoring Procedure:

The collected response sheets were scored with the help of a scoring key prepared by investigator. The response sheets were scored by assigning scores of **1** and **0** the categories **Yes**/**No** for positive items. The score is reversed for negative items.

Distributions of sample based on the sub-variables are given below:

Table – 3.3

1. Gender wise distribution of sample

Gender	No. of students	Percentage
Male	202	50.50
Female	198	49.50
Total	400	100

The sample consists of both male (202) and female (198) high school students. The percentages corresponding to male and female students are 50.50% and 49.50% percentage respectively.

Table – 3.4

2. Locality wise distribution of sample

Locality	No. of students	Percentage
Rural	180	45.00
Urban	220	55.00
Total	400	100

The sample consists of both rural (180) and urban (220) high school students. The percentages corresponding to rural and urban students are 45% and 55% percentage respectively.

Table – 3.5

3. Distribution of sample based on Educational Qualification of Father

Educational Qualification of Father	No. of students	Percentage
Up to SSLC	257	64.25
H .Sc	75	18.75
Above	68	17.00
Total	400	100

The sample consists of the students based on father qualification is upto SSLC (257), H .Sc (75) and above H. Sc (68). The percentage corresponding based on father's qualification upto SSLC (64.25%), H.Sc (18.75%) and above H. Sc (17%) respectively.

Table – 3.6

4. **Distribution of sample based on Educational Qualification of Mother**

Educational Qualification of Mother	No. of students	Percentage
Upto SSLC	259	64.75
H. Sc	77	19.25
Above	64	16.00
Total	400	100

The sample consists of students based on mother qualification up to SSLC (259), H. Sc (77) and above H. Sc (64). The percentage corresponding to mother qualification upto SSLC (64.75%), H. Sc (19.25%) and above H. Sc (16%) respectively.

Table – 3.7

5. Type of School wise distribution of sample

Type of School	No. of students	Percentage
Government	159	39.75
Aide	64	16.00
Private	177	44.25
Total	400	100

The sample consists of high school students based on type of school such as Government 159), Aided (64) and Private (177) high school students. The percentage corresponding to Government, Aided and Private school students are 39.75%, 16% and 44.25% respectively.

DATA COLLECTION PROCEDURE

Data were collected from high school students in various schools of Kanyakumari District.. The investigator visited the different schools after seeking permission from the principals of school concerned.

A rapport was established with the respondents before the administration of the tool. The students were first asked to fill up the general information sheet.

After filling all the items in the general information sheet the investigator gave necessary directions to fill completely and correctly all the items of questionnaire. They were asked to fill all the items in each section by putting a tick mark against the response Yes/No. After completing the items by all the students, the investigator carefully collected all the questionnaires along with the general information sheet.

STATISTICAL TECHNIQUES USED:

Statistical techniques are very important for any research. The relevant statistical techniques help the investigator to analyses and interpret the data meaningfully in the study. Here in this present study the investigator used following statistical techniques:

1. Percentage
2. Arithmetic Mean
3. Standard Deviation
4. t-test (test of significance)
5. ANOVA (Analysis of variance)

Percentage:

Percentage helps in the comparative study of fractions. It is always means per hundred and hence it is calculated on 100.

Mean:

It is the simplest but most useful measure of central tendency. It is more suitable for further statistical treatments. The investigator has used the following formula for calculating arithmetic mean.

$$\textbf{Arithmetic Mean} = A + \frac{\varepsilon fd}{N} XC$$

Where,

A = Assumed mean of the scores obtained

f = Frequency of each class interval

d = Deviation of scores from the assumed mean

C = Class interval of the frequency distribution

N = Total frequency

Standard Deviation:

Standard deviation provides a standard and for measuring distances of various scores from their mean. It is the one of the very useful measure of dispersion and it measure the scatteredness of the values.

The investigator has used the following formula for calculating standard deviation.

$$\textbf{Standard Deviation} = \textbf{C X} \sqrt{\frac{(\sum \boldsymbol{fd^2})}{\boldsymbol{N}} - \left(\frac{\sum \boldsymbol{fd}}{\boldsymbol{N}}\right)^2}$$

Where,

C = Class interval

d = Deviation of score from the assumed mean

f = Frequency

N = Total frequency

test of significance (t - test):

For finding the significant level of difference between two groups of population, t-test was used. For calculating t-values the scores of mean and standard deviation are needed. If the calculated t-value is 2.58 and above then the significant difference at 0.01 levels and if the value is between 1.96 and 2.58 the difference is not significant.

$$t = \frac{M_1 - M_2}{\sqrt{\frac{\sigma 1^2}{N_1} + \frac{\sigma 2^2}{N_2}}}$$

Where,

M_1 = Arithmetic mean of the first group

M_2 = Arithmetic mean of the second group

σ_1 = Standard deviation of the first group

σ_2 = Standard deviation of the second group

N_1 = Total number in the first group

N_2 = Total number in the second group

ANOVA (Analysis of variance):

To find out whether there is any significant difference between the means of two random samples, t-test is used. The analysis of variances and the corresponding test of significances based up on F – distributions are used in their case. The analysis of variance leads with variances rather than with standard deviations and standard errors. The investigator has used the following formula for calculating the ANOVA.

$$\textbf{F – Ratio} = \frac{\textbf{Mean Square variance between the group}}{\textbf{Mean Square variance within the group}}$$

Scheffe's Procedure:

Significance, obtained as the results of ANOVA, does not point out which of the three groups differ among themselves. In such cases, the comparison of the differences between means for any two groups is done using Scheffe's procedure (Scheffe's 1957). Scheffe's test is one of the well known multiple group comparison tests.

CHAPTER – IV

ANALYSIS AND INTERPRETATION OF DATA

Analysis and interpretation are central steps in the research process. The goal of analysis is summarize the collected data in such a way that they provide answer to the question that triggered the research. Interpretation is the search for the broader meaning of research findings. Through interpretation the meaning and implication become clear.

Analysis means the categorizing, ordering, manipulating and summarizing of data. Interpretation takes the results of analysis, makes inferences, pertinent to the research relations studied and draws conclusions about these relations. Interpretation of the data is necessary to explain and to find meaning of the data.

The first step in analyzing qualitative research is often organizing the data. Qualitative research often results in voluminous notes from observations, interviews and or documents. The method organizing these data will differ, depending on the research strategy and data have been organized, the research can move to the second stage in data analysis description only after the data have been organized and described does the researcher begin the final and most critical phase of the analysis process, interpretation.

Analysis of data means studying the organized material in order to discover inherent facts the data are studied from as many angles as possible to explore the new facts.

The process of interpolation is essentially one of stating what the result show. This calls for a careful logical and critical examination of the results obtained after analysis.

According to Francis Rummel 'The analysis and interpretation of data involve the objective material in the possession of the researcher and his subjective reaction and desires to derive from the data the inherent meanings in their relation to the problems'.

To avoid making conclusions or interpretations from the insufficient or invalid data, the final analysis must be anticipated in detail when plans are being made for collecting information. The problem should be analyzed in detail to see what data are necessary in its solution and to be assured that the methods used will provide for definite answers "The researcher must determine whether or not the factors chosen for study satisfy all conditions of the problem and if the sources to be used will provide the requisite data".

The data collected from 400 high school students were subjected to different types of statistical techniques like arithmetic mean, percentage, standard deviation, t- test and analysis of variance (ANOVA). The details of analysis are presented in this chapter.

In the present study the data collected were analyzed using the following statistical techniques.

Percentage wise distribution of samples on their problems in learning Analytical Geometry

Problems faced by high school students in learning analytical geometry for the total sample.

Table – 4.1

Problems in Learning Analytical Geometry	**Count**	**Percentage**
Low	58	14.50
Medium	276	69.00
High	66	16.50
Total	400	100.00

Out of 400 samples, 14.50% have low, 69.00% have medium and 16.50% of students have high level of problems in learning analytical geometry.

Problems faced by students in learning analytical geometry for the dimension problem solving. Percentage wise distribution

Table – 4.2

Problems with respect to problem solving	**Count**	**Percentage**
Low	61	15.25
Medium	287	71.75
High	52	13.00
Total	400	100.00

Out of 400 samples, 15.25% have low, 71.75% have medium and 13.00% have high level of problems in learning analytical geometry.

Problems faced by students in learning analytical geometry for the dimension Diagrammatic Representation - Percentage wise distribution

Table – 4.3

Problems with respect to diagrammatic representation	Count	Percentage
Low	61	15.25
Medium	257	64.25
High	82	20.50
Total	400	100.00

Out of 400 samples, 15.25% have low, 64.25% have medium and 20.50% have high level of problems in learning analytical geometry.

Problems faced by students in learning analytical geometry for the dimension Theorems and Proves - Percentage wise distribution

Table – 4.4

Problems with respect to theorems and proves	**Count**	**Percentage**
Low	52	13.00
Medium	274	68.50
High	74	18.50
Total	400	100.00

Out of 400 samples, 13.00% have low, 68.50% have medium and 18.50% have high level of problems in learning analytical geometry.

Problems faced by students in learning analytical geometry for the dimension Concept Formation - Percentage wise distribution

Table – 4.5

Problems with respect to concept formation	**Count**	**Percentage**
Low	65	16.25
Medium	263	65.75
High	72	18.00
Total	400	100.00

Out of 400 samples, 16.25% have low, 65.75% have medium and 18.00% have high level of problems in learning analytical geometry.

Total comparison of problems in Learning Analytical Geometry based on Gender

Table – 4.6

Gender	**Mean**	**SD**	**N**	**t**	**P**	**Remark**
Male	26.14	6.25	202	0.72	0.473	N. S
Female	25.63	7.83	198			

From the table it is evident that the calculated values (t = 0.72, p >0.05) is not significant at any level. Therefore the null hypothesis "there exists no significant difference between male and female high school students on their problems in learning analytical geometry" is accepted. (i.e.) There exists no significance difference between male and female high school students on their problems in learning analytical geometry.

Comparison of Problems Based on Gender

The two groups of students namely male and female were subjected for study as per the analysis given in table – 4.7

Table – 4.7

Section	Gender	Mean	SD	N	t	P	Remark
Problem Solving	Male	7.16	2.16	202	2.05	0.041	Significant at 0.05 level
	Female	6.68	2.50	198			
Diagrammatic Representation	Male	6.65	2.19	202	0.17	0.862	NS
	Female	6.69	2.41	198			
Theorems and Proves	Male	6.26	2.29	202	0.44	0.663	NS
	Female	6.15	2.73	198			
Concept Formation	Male	6.07	2.57	202	0.11	0.911	NS
	Female	6.10	2.81	198			

From the table is evident that the calculated value (t = 0.17, 0.44 and 0.11, p>0.05) for diagrammatic representation, theorems and proves, and concept formation is not significant at any level. Therefore the null hypothesis

“there exists no significant difference between male and female high school students on their problems in learning analytical geometry based on diagrammatic representation, theorems and proves and concept formation” is accepted. (i.e.) There exist no significance difference between male and female high school students on their problems in learning analytical geometry based on diagrammatic representation, theorems and prove and concept formation.

But remaining section of problem in learning analytical geometry in mathematics with respect to problem solving value ($t=2.05$, $p<0.01$) is significant at 0.05 level. Therefore the null hypothesis “there exists no significant difference between male female high school students in learning analytical geometry in mathematics with respect to problem solving based on gender” is rejected. (i.e.) there exists significant difference between male and female high school students in learning analytical geometry in mathematics based on gender. The mean value (7.16) shows that male students faces more problems in learning analytical geometry in mathematics with respect to problem solving compared to female students.

Total comparison of problems in Learning Analytical Geometry based on Locality

The two groups of students namely rural and urban were subjected for study as per the analysis given in table – 4.8

Table – 4.8

Locality	**Mean**	**SD**	**N**	**t**	**P**	**Remark**
Rural	26.54	7.41	180	1.66	0.097	N.S
Urban	25.35	6.75	220			

From the table it is evident that the calculated values ($t = 1.66$, $p < 0.05$) is not significant at any level. Therefore the null hypothesis "there exists no significant difference between rural and urban high school students on their problems in learning analytical geometry" is accepted. (i.e.) There exists no significance difference between male and female high school students on their problems in learning analytical geometry.

Comparison of Problems Based on Locality

The two groups of students namely rural and urban were subjected for study as per the analysis given in table – 4.9

Table – 4.9

Section	Locality	Mean	SD	N	t	P	Remark
Problem Solving	Rural	7.11	2.45	180	1.43	0.153	NS
	Urban	6.77	2.25	220			
Diagrammatic Representation	Rural	6.96	2.23	180	2.27	0.02	Significant at 0.05 level
	Urban	6.44	2.33	220			
Theorems and Proves	Rural	6.29	2.54	180	0.63	0.529	NS
	Urban	6.13	2.51	220			
Concept Formation	Rural	6.19	2.64	180	0.71	0.48	NS
	Urban	6.00	2.73	220			

From the table is evident that the calculated values (t = 1.43, 0.63and 0.71, p >0.05) for problem solving, theorems and proves, and concept formation is not significant at any level. Therefore the null hypothesis “there exists no significant difference between rural and urban high school students on their problems in learning analytical geometry based on problem solving, theorems and proves, and concept formation” is accepted. (i.e.) There exist no significance difference between rural and urban high school students on their

problems in learning analytical geometry based on problem solving, theorems& prove and concept formation.

But remaining section of problems in learning analytical geometry in mathematics with respect to diagrammatic representation values ($t=2.27$, $p<0.05$) is significant at 0.05 level. Therefore the null hypothesis "there exists no significant difference among high school students in learning Analytical Geometry in Mathematics with respect to diagrammatic representation based on locality" is rejected. (i.e.) there exists significant difference between rural and urban high school students on their problems in learning analytical geometry in mathematics based on diagrammatic representation. The mean values (6.96) shows that rural students faces more problems in learning analytical geometry in mathematics with respect to diagrammatic representation to urban students.

Total comparison of problems in Learning Analytical Geometry based on type of school

The three groups of students namely government, aided and private were subjected for study as per the analysis given in table – 4.10

Table – 4.10

Type of School	Mean	SD	Source	Sum of squares	df	Mean square	F	P	Remark
Govt	26.59	7	Between Group	1438.21	2	719.11	15.42	0.000	Sig. at 0.01 level
Aided	29.30	8.61	Within Group	18509.21	397	46.62			
Private	24.02	5.89	Total	19947.42	399				

From the table it is evident that the calculated values ($F=15.42$, $p<0.01$) is significant at 0.01 level. Therefore the null hypothesis "there exists no significant difference among government, aided and private high school students on their problems in learning analytical geometry" is rejected. (i.e.) There exists significance difference among government, aided and private high school students on their problems in learning analytical geometry.

The result does not help to identify exactly the pairs of groups which differ significantly. Hence, scheffe's multiple comparison is used for further analysis.

Result of scheffe's procedure for the problem in learning Analytical Geometry based on Type of School

Table – 4.11

Type of School	N	Pair	Scheffe's P	Remark
Govt (A)	159	A Vs B	0.028	Significant at 0.05 level
Aided (B)	64	B Vs C	0.000	Significant at 0.01 level
Private (C)	177	A Vs C	0.003	Significant at 0.01 level

The pair wise comparison showed that Government, Aided and Private high school students significantly differ at any level based on type of school.

Comparison of Problems in Learning Analytical Geometry Based on Type of School

The three groups of students based on type of school were subjected for study as per the analysis given in table – 4.12

Table – 4.12

Section	Type of School	Mean	SD	Source	Sum of square	df	Mean Square	F	p	Remark
Problem Solving	Govt	7.03	2.15	Between Group	103.13	2	51.57	9.82	0.000	Sig. at 0.01 level
	Aided	7.92	2.35	Within Group	2085.41	397	5.25			
	Private	6.46	2.39	Total	2188.54	399				
Diagrammatic Representation	Govt	6.94	2.28	Between Group	90.4	2	45.19	8.89	0.000	Sig. at 0.01 level
	Aided	7.41	2.5	Within Group	2017.7	397	5.08			
	Private	6.17	2.14	Total	2108.10	399				
Theorems and Proves	Govt	6.42	2.38	Between Group	63.47	2	31.74	5.11	0.006	Sig. at 0.01level
	Aided	6.83	2.87	Within Group	2465.57	397	6.21			
	Private	5.79	2.44	Total	2529.04	399				
Concept Formation	Govt	6.20	2.68	Between Group	114.3	2	57.16	8.21	0.000	Sig. at 0.01 level
	Aided	7.14	2.93	Within Group	2763.5	397	6.96			
	Private	5.60	2.49	Total	2877.8	399				

From the table it is evident that the problems in learning Analytical Geometry with respect to problem solving, diagrammatic representation, theorems & proves and concept formation($F = 9.82, 8.89, 5.11$ and 8.21, $p<0.01$) which is significant at 0.01 level. Therefore the null hypothesis "There exists no significant difference among high school students on their problems in learning analytical geometry based on educational qualification of father

with respect to problem solving, diagrammatic representation, theorems& prove and concept formation" is rejected. (i.e.) There exists significant difference among government, aided and private high school students on their problems in learning analytical geometry based on problem solving, diagrammatic representation, theorems and proves, and concept formation.

Comparison of Problems in Learning Analytical Geometry Based on Type of School

The three groups of students based on type of school were subjected for study as per the analysis given in table – 4.13

Table – 4.13

Section	Type of School	N	Pair	Scheffe's P	Remark
Problem Solving	Govt (A)	159	A vsB	0.033	Sig.at 0.05 level
	Aided (B)	64	BvsC	0.000	Sig.at 0.01 level
	Private (C)	177	A vs C	0.076	NS
Diagrammatic Representation	Govt (A)	159	A vsB	0.372	NS
	Aided (B)	64	BvsC	0.001	Sig.at 0.01 level
	Private (C)	177	A vsC	0.008	Sig.at 0.01 level
Theorems and Proves	Govt (A)	159	AvsB	0.540	NS
	Aided (B)	64	BvsC	0.017	Sig.at 0.05 level
	Private (C)	177	AvsC	0.070	NS
Concept Formation	Govt (A)	159	AVsB	0.056	NS
	Aided (B)	64	BVsC	0.000	Sig.at 0.01 level
	Private (C)	177	AVsC	0.116	NS

From the table it is evident that for all calculated values (F= 9.82, 8.89, 5.11 and 8.21, p >0.01) for problem solving, diagrammatic representation, theorems and proves, and concept formation significant at any level. Therefore the null hypothesis "there exists no significant difference between government. aided and private high school students on their problems in learning analytical geometry in mathematics based on problem solving, diagrammatic

representation, theorems and proves, and concept formation ” is rejected. (i.e) there exists any significant difference between government, aided and private high school students on their problems in learning analytical geometry based on problem solving, diagrammatic representation, theorems and proves, and concept formation.

Total comparison of problems in Learning Analytical Geometry based on Educational Qualification of Father

The two groups of students based on father's qualification were subjected for study as per the analysis given in table – 4.1

Table – 4.14

Educational Qualification of Father	Mean	SD	Source	Sum of squares	df	Mean square	F	P	Remark
Upto SSLC	25.89	6.96	Between Group	94.60	2	47.30	0.95	0.389	NS
HSc	25.11	7.29	Within Group	19852.82	397	50.01			
Above	26.74	7.27	Total	19947.42	399				

From the table it is evident that the calculated values ($F= 0.95$, $p > 0.05$) is not significant at any level. Therefore the null hypothesis "there exists no significant difference among high school students on their problems in learning analytical geometry based on educational qualification of father" is accepted.

Comparison of Problems in Learning Analytical Geometry Based on Educational Qualification of Father

The three groups of students based on father's qualification were subjected for study as per the analysis given in table – 4.15

Table – 4.15

Section	Educational Qualification of Father	Mean	SD	Source	Sum of square	df	Mean Square	F	P	Level
Problem Solving	Upto SSLC	6.97	2.31	Between Group	6.86	2	3.43	0.62	0.536	NS
	HSc	6.65	2.27	Within Group	2181.68	397	5.50			
	Above HSc	7.03	2.54	Total	2188.54	399				
Diagrammatic Representation	Upto SSLC	6.74	2.24	Between Group	17.62	2	8.81	1.67	0.189	NS
	HSc	6.25	2.4	Within Group	2090.47	397	5.27			
	Above HSc	6.9	2.38	Total	2108.10	399				
Theorems and Proves	Upto SSLC	6.14	2.5	Between Group	4.88	2	2.44	0.38	0.682	NS
	HSc	6.21	2.41	Within Group	2524.16	397	6.36			
	Above HSc	6.44	2.71	Total	2529.04	399				
Concept Formation	Upto SSLC	6.04	2.56	Between Group	6.61	2	3.31	0.46	0.633	NS
	HSc	5.99	2.89	Within Group	2871.23	397	7.23			
	Above HSc	6.37	2.94	Total	2877.84	399				

From the table it is evident that the problems in learning analytical geometry with respect to problem solving, diagrammatic representation, theorems and proves, and concept formation (F= 0.62, 1.67, 0.38 and 0.46, $p>0.05$) is not significant at any level. Therefore the null hypothesis "There exists no significant difference among high school students on their problems inlearning analytical geometry based on educational qualification of father with

respect to problem solving, diagrammatic representation, theoremsandproves and concept formation" is accepted.

Total comparison of problems in Learning Analytical Geometry based on Educational Qualification of Mother

The three groups of students based on mother's qualification were subjected for study as per the analysis given in table – 4.16

Table – 4.14

Educational Qualification of Mother	Mean	SD	Source	Sum of squares	df	Mean square	F	P	level
Upto SSLC	25.81	6.65	Between Group	91.6	2	45.79	0.92	0.401	NS
HSc	26.74	8.43	Within Group	19855.8	397	50.01			
Above	25.16	6.95	Total	19947.4	399				

From the table it is evident that the calculated values ($F= 0.92$, $p > 0.05$) is no significant at any level. Therefore the null hypothesis "there exists no significant difference among high school students on their problems in learning analytical geometry based on educational qualification of mother" is accepted.

Comparison of Problems in Learning Analytical Geometry Based on Educational Qualification of Mother

The two groups of students based on mother's qualification were subjected for study as per the analysis given in table – 4.17

Table – 4.17

Section	Educational Qualification of Mother	Mean	SD	Source	Sum of square	df	Mean Square	F	p	Remark
Problem Solving	Upto SSLC	7	2.22	Between Group	11.7	2	5.86	1.07	0.345	NS
	HSc	6.97	2.53	Within Group	2176.8	397	5.48			
	Above HSc	6.53	2.56	Total	2188.5	399				
Diagrammatic Representation	Upto SSLC	6.62	2.22	Between Group	4.2	2	2.12	0.40	0.671	NS
	HSc	6.88	2.37	Within Group	2103.867	397	5.30			
	Above HSc	6.63	2.55	Total	2108.097	399				
Theorems and Proves	Upto SSLC	6.1	2.44	Between Group	17.7	2	8.87	1.40	0.247	NS
	HSc	6.64	2.7	Within Group	2511.3	397	6.33			
	Above HSc	6.09	2.58	Total	2529.0	399				
Concept Formation	Upto SSLC	6.08	2.62	Between Group	4.1	2	3.31	0.28	0.756	NS
	HSc	6.25	3.04	Within Group	2873.7831	397	7.24			
	Above HSc	5.91	2.51	Total	2877.8401	399				

From the table it is evident that the problems in learning analytical geometry with respect to problem solving, diagrammatic representation, theorems & proves and concept formation (F= 1.07, 0.40, 1.40 and 0.28, $p>0.05$) which is not significant at any level. Therefore the null hypothesis "There exists no significant difference among high school students on their problems in learning Analytical Geometry based on educational qualification of mother with respect to problem solving, diagrammatic representation, and theorems and proves and concept formation" is accepted.

Tenability Hypotheses:

1. The first null hypothesis "There is no significant difference between male and female high school students in learning Analytical Geometry in Mathematics" is accepted.
2. The second null hypothesis "There is no significant difference between male and female high school students in learning Analytical Geometry in Mathematics based on diagrammatic representation, theorems & proves and concept formation" is accepted. But there is significant difference between male and female high school students in learning Analytical Geometry in Mathematics based on problem solving is rejected.

3. The third null hypothesis “There is no significant difference between rural and urban high school students in learning Analytical Geometry in Mathematics” is accepted.
4. The fourth null hypothesis “There is no significant difference between male and female high school students in learning Analytical Geometry in Mathematics based on problem solving, theorems & proves and concept formation” is accepted. But there is significant difference between rural and urban high school students in learning Analytical Geometry in Mathematics based on diagrammatic representation is rejected.
5. The ninth null hypothesis “There is no significant difference among government, aided and private high school students in learning Analytical Geometry in Mathematics” is rejected.
6. The tenth null hypothesis “There is no significant difference among government, Aided and private high school students in learning Analytical Geometry in Mathematics based on problem solving, diagrammatic representation, theorems & proves and concept formation” is rejected.
7. The eleventh null hypothesis “There is no significant difference between high school students in learning Analytical Geometry in Mathematics based on their educational qualification of father” is accepted.
8. The twelfth null hypothesis “There is no significant difference between high school students in learning Analytical Geometry in Mathematics

based on educational qualification of father with respect to problem solving, diagrammatic representation, theorems & proves and concept formation" is accepted.

9. The thirteenth null hypothesis "There is no significant difference between high school students in learning Analytical Geometry in Mathematics based on their educational qualification of mother" is accepted.
10. The fourteenth null hypothesis "There is no significant difference between high school students in learning Analytical Geometry in Mathematics based on educational qualification of mother with respect to problem solving, diagrammatic representation, theorems & proves and concept formation" is accepted.

Chapter – V

FINDINGS, CONCLUSION AND SUGGESTIONS

THE STUDY IN RESPROSPECT

In this chapter an attempt is made by the investigator to summarize all the findings and conclusions drawn from the investigation. Educational implication of the study and further research are also included.

METHOD ADOPTED

Method

The method used for the study was normative survey method

Sample

The study was conducted on a sample of 400 High school students..

Tools used for the study

For the present study the following tools were used

i. Questionnaire prepared by the investigator

ii. Personal data sheet

Statistical Techniques used for the study

For the present study the following statistical techniques were used

i. Arithmetic Mean

ii. Percentage

iii. t- test

iv. ANOVA

OBJECTIVES OF THE STUDY

5. To construct and validate a tool to measure problems faced by high school students in learning Analytical Geometry in Mathematics.
6. To identify the problems faced by high school students in learning Analytical Geometry in Mathematics.
7. To identify the problems faced by high school students in learning Analytical Geometry in Mathematics with respect to
    a) Problem Solving
    b) Diagrammatic Representation
    c) Theorems and Proves
    d) Concept Formation
8. To find whether there exist any significant difference in the problems of high school students in learning Analytical Geometry in mathematics based on .
        a) Gender
        b) Locality
        c) Religion
        d) Community
        e) Type of School

f) Educational Qualification of father

g) Educational Qualification of mother

HYPOTHESES

1. There is no significant difference in the mean scores of male and female high school students on their problems faced by learning Analytical Geometry in Mathematics.
2. There is no significant difference in the mean scores of male and female high school students on their problems faced by learning Analytical Geometry in Mathematics based on

    a) Problem Solving

    b) Diagrammatic Representation

    c) Theorems and Proves

    d) Concept Formation

3. There is no significant difference in the mean scores of rural and urban high school students on their problems faced by learning Analytical Geometry in Mathematics.
4. There is no significant difference in the mean scores of rural and urban high school students on their problems faced by learning Analytical Geometry in Mathematics based on

a) Problem Solving

b) Diagrammatic Representation

c) Theorems and Proves

d) Concept Formation

5. There is no significant difference between government, aided and private high school students on their problems in learning Analytical Geometry in Mathematics.

6. There is no significant difference between government, aided and private high school students on their problems in learning Analytical Geometry in Mathematics based on
    a) Problem Solving
    b) Diagrammatic Representation
    c) Theorems and Proves
    d) Concept Formation
7. There is no significant difference among high school students on their problems in learning Analytical Geometry in Mathematics based on educational qualification of father.
8. There is no significant difference among high school students on their problems in learning Analytical Geometry in Mathematics based on educational qualification of father with respect to
    a) Problem Solving
    b) Diagrammatic Representation
    c) Theorems and Proves
    d) Concept Formation

9. There is no significant difference among high school students on their problems in learning Analytical Geometry in Mathematics based on educational qualification of mother.
10. There is no significant difference among high school students on their problems in learning Analytical Geometry in Mathematics based on educational qualification of mother with respect to

    a) Problem Solving
    b) Diagrammatic Representation
    c) Theorems and Proves
    d) Concept Formation

FINDINGS

1. There is no significant difference between male and female high school students on their problems in learning Analytical Geometry in Mathematics. This finding is supported by the obtained result ($t=0.22, P<0.05$).
2. There existed significance difference between male and female high school students on their problems in learning analytical geometry in

mathematics with respect to problem solving. This finding is supported by the obtained result (t=2.05,P>0.05).

3. There existed no significance difference between rural and urban high school students on their problems in learning analytical geometry in mathematics. This findings is supported by the obtained result (t=1.66,P<0.05).
4. There existed significance difference between rural and urban high school students on their problems in learning analytical geometry in mathematics with respect to diagrammatic representation. The finding is supported by the obtained result (t=2.27, P>0.05).
5. There existed significance difference among government, aided and private high school students on their problems in learning analytical geometry in mathematics. The finding is supported by the obtained result (t=2.27, P>0.05).

CONCLUSION

Gender, Locality, Type of school, Educational qualification of father and Educational qualification of mother has impact in problems to learning analytical geometry. Among the total samples, female students possessed more problems in learning analytical geometry than other male students in problem solving. Rural students possessed more problems with respect to learning analytical geometry than other urban students in diagrammatic representation. Private school students possessed more problems with respect to learning analytical geometry than other government and aided students in problem

solving, diagrammatic representation, theorems and proves, and concept formation.

EDUCATIONAL IMPLICATIONS

The findings of the investigation regarding problems faced by high school students in learning analytical geometry in Mathematics have certain important implications. Some of them are listed below.

1. The present investigation has involved a standardized questionnaire, which can be used as a tool to find out the problems faced by high school students in learning analytical geometry in Mathematics.
2. The study throws light on the different areas of difficulties of mathematics experienced by high school students.
3. The present investigation has brought to light the fact the majority of pupils experience slight problems in the areas of problem solving, diagrammatic representation, and theorems and proves, and concept formation.
4. The proper motivation, guidance, methods of teaching helps in removing certain problems in learning analytical geometry.

SUGGESTION FOR FURTHER RESEARCH

1. The study conducted on further more studies in high school students in various topics in mathematics.

2. The present investigation is conducted on high school students only and it can be extend to higher secondary school and college students for mathematics group only.
3. The investigation may be extended to other subjects.
4. The present study in limited to the problems in four areas of analytical geometry such as problem solving, diagrammatic representation, theorems and proves, and concept formation. The study can be extended by considering various other problems in learning analytical geometry in mathematics.

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ABSTRACTS

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APPENDIX – A

N.V.K.S.D COLLEGE OF EDUCATION

ATTOOR -629191

GENERAL DATA SHEET

2013-2014

Instructions:

Certain personal matters related to you are required for my research purpose. Kindly write below or put a tick mark (✓) where ever necessary. Your response will be kept confidential.

Name of the student	:	
Name of the school	:	
Sex	:	Male / Female
Locality	:	Rural / Urban
Religion	:	Hindu / Christian/ Muslim
Community	:	BC / MBC / SC / ST
Type of Schoola	:	Govt/Aided/HSc/Management
Educational Qualification Father	:	Upto SSLC / HSc/ Above
Educational Qualification Mother	:	Upto SSLC / HSc/ Above
Type of school	:	Govt / Aided / Management
Type of Family	:	Joint/ Nuclear

APPENDIX – B

PROBLEM FACED BY HIGH SCHOOL STUDENT IN LEARNING ANALYTIC GEOMETRY IN MATHEMATICS

Questionnaire – (Draft)

(Prepared by R.Rajendran&Mr.K.GireeshKumar)

(2013-2014)

Instructions:

Certain questions related in the problem faced by students in learning analytic geometry are given below. Read carefully each questions and put a tick mark (✓) against Yes/ No. Attend all questions without any omission and your response will be kept confidential and be used for research purpose only.

SECTION - A

Sl. No	Statements	Yes	No
1	I like to join the group activities for solving the problems. fzf;FfSf;Fj; jPHTfhZk; NghJ FOr; nray;ghl;il tpUk;GfpNwd;.		
2	I feel sad when I do not get the accurate answer for the problem. fzf;FfSf;Fj; jPHTfhZk; NghJ Jy;ypakhd tpil fpilf;fhj NghJ fbdkhf czUfpNwd		
3	;.I .feel very interested to do the problems for equations for circles. tl;lq;fspd; rkd;ghLfSf;Fj; jPHT fhz;gij MHtKld; fw;fpNwd;.		
4	I find it difficult to memorize the equations for the analytical geometry problem. gFKiwtbtpaypy; fzf;FfSf;Fj; jPHTfhZk; NghJmbg;giltiuaiwfis epidTf;F nfhz;L tUtij fbdkhf czUfpNwd;.		
5	I am interested to solve the problems by using mathematical operations. fzf;FfSf;Fj; jPHTfhZk; NghJ fzpjr; nray;fisg; gad;gLtij MHtKld; fw;fpNwd;.		
6	I find it difficult to classify the types of parabola. gutisaj;jpd; tiffis tifg;gLj;Jtij fbdkhf czUfpNwd;.		

7	I like to find solution for the three dimensional figures. Kg;ghpkhz glq;fspd; rkd;ghLfSf;Fj; jPHT fhz;gij tpUk;GfpNwd.;		
8	I find it difficult to solve the equations of analytical geometry. gFKiwtbtpaypy; rkd;ghLfSf;Fj; jPHT fhz;gij fbdkhf czUfpNwd;.		
9	;.I would like to learn direction ratio's in analytical geometry. gFKiwtbtpaypy; jpirf; nfhird;fisg; fw;gij tpUk;GfpNwd.;		
10	I am confused in doing the problems of slope of lines. NfhLfspd; rha;Tfis fzf;fpLtjpy; Fog;gkilfpNwd		
11	I like to solve the problems of angles between two straight lines. ,uz;L NeHf;NfhLfSf;F ,ilg;gl;l Nfhzq;fis kjpg;gpLtij tpUk;GfpNwd.;		
12	I find it difficult to solve the problems related to latus rectum. ,af;FtiufSf;Fj; jPHT fhz;gij fbdkhf czUfpNwd;.		
13	I am interested to do the problems related to coordinating geometry. Maj;njhiyT mr;Rfspd; J}uj;ij fzf;fpLtij MHtKld; fw;fpNwd;.		
14	I find it difficult to understand the equation of tangent. njhLNfhLfspd; rkd;ghLfis Ghpe;Jnfhs;tij fbdkhf czUfpNwd;.		
15	I like to compare the applied mathematics with analytical geometry. gFKiwtbtpay; fzf;Ffis eilKiw fzf;FfSld; xg;gpl;L jPHT fhz;gij tpUk;GfpNwd		
16	I am confused while solving the same problem by using different problem solving methods. xNu khjphpahd fzf;FfSf;F gy;NtW jPHTfhZk; Kiwfis gad;gLj;Jtjpy; ehd; Fog;gkilfpNwd		
17	I am interested to do reasoning problems in analytical geometry. gFKiwtbtpaypy; fhuzkwpjy; tif fzf;FfSf;F jPHTfhz;gjpy; MHtk; fhl;LfpNwd;.		
18	I find it difficult to understand the definitions of analytical geometry. gFKiwtbtpay; tiuaiwfis Ghpe;Jnfhs;tij fbdkhf czUfpNwd;.		

19	I would like to solve the logical problems in analytical geometry. gFKiwtbtpaypy; jUf;fhPjpahd fzf;FfSf;F jPHTfhz;gij tpUk;GfpNwd;.		
20	;.I feel lack of concentration when I solve the problems in wrong way. fzf;FfSf;Fj; jPHTfhZk; NghJ ftdf;Fiwtpdhy; jtW nra;tjhf czUfpNwd		

SECTION – B

Sl.No	Statements	Yes	No
1	I find it easy to solve the problems using figures. glq;fisg; gad;gLj;jp jPHT fhz;gJ vspjhf Njhd;WfpwJ.		
2	I get confused when compare the mathematical shapes. fzpj tbtq;fis xg;gpLtjpy; Fog;gkilfpNwd;.		
3	;.I like to use the centroid in problem solving. jPHTfhzypy; ikaf;NfhLfis gad;gLtj;Jtij tpUk;GfpNwd;.		
4	I find it difficult to measure the readings of diagrams. glq;fspy; msTfisf; Fwpg;gpLtij fbdkhf czUfpNwd;		
5	I am interested to find solution for the quadrilateral shapes. ehw;fu tbtq;fSf;F jPHT fhz;gij MHtKld; fw;fpNwd;.		
6	I feel to difficult to use the diagrams in equations. rkd;ghLfspy; glq;fisg; gad;gLj;Jtij fbdkhf czUfpNwd;.		
7	;.I think that the straight line figures make it easy to solve the slope and intersect form. NeHNfhLfspd; rha;T kw;Wk; ntl;Lj;Jz;L fhz;gij vspjhf epidf;fpNwd;.		
8	I find it difficult to findout the area of triangle by using more than one figures. Kf;Nfhzj;jpd; gug;gsT fhz xd;Wf;F Nkw;gl;l glq;fis gad;gLj;Jtij		

	fbdkhf czUfpNwd;		
9	I am interested to find solution by using concentric circles. nghJ ikatl;lq;fSf;Fj; jPHT fhz;gij MHtKld; fw;fpNwd		
10	I applied problems I find it difficult to use three dimensional figures. Kg;ghpkhz glq;fis jPHTfhz gad;gLj;Jtij fbdkhf czUfpNwd;.		
11	I like to use figure in sector formula. tl;lf;Nfhzg; gFjpapd; tha;g;ghl;by; glq;fis gad;gLj;Jtij tpUk;GfpNwd;.		
12	I find it difficult to draw a diagram for incircle. gy;NtW tifahd NeHf;NfhLfspd; glq;fs; tiutJfbdkhf ,Uf;fpwJ.		
13	I am interested to find the solution of midpoint by using line segment. Nfhl;Lj;Jz;Lfis gad;gLj;jp eLg;Gss;sp fhz;gij MHtKld; nra;fpNwd;.		
14	I find it difficult to solve the problems using more than one figure. xNukhjphpahdfzf;Ffspy; xd;Wf;F Nkw;gl;l glq;fis gad;gLj;Jtij fbdkhd czUfpNwd;.		
15	I like to used slight lines by solving angle of inclination. rha;TNfhzq;fSf;F jPHTfhz NeHf;NfhLfisg; gad; gLj;Jtij tpUk;GfpNwd;.		
16	I find it difficult to use the straight line by solving the problem of slope-Intercept form. rha;T- ntl;Lj;Jz;L mikg;ig gad;gLj;jp NeHNfhLfSf;Fj; jPHTfhz;gij fbdkhd czUfpNwd;.		
17	I feel that it is easy to find the solution of slopes by using parallel lines. ,izNfhLfisg; gad;gLj;jp rha;T fhz;gij vspjhf czUfpNwd;.		
18	I am confused to solve the nature of consistency by using triangle.		

	jPHTfspd; xUq;fikj;jd;ikia fhz Kf;Nfhzj;ij gad;gLj;Jtij fbdkhf czUfpNwd;.		
19	I like to use the plane by solving collinearity of three points. %d;WGs;spfspd; xUq;fikj;jd;ikf;F jPHTfhz jsq;fisg; gad;g;gLj;Jtij tpUk;GfpNwd;.		
20	I find it difficult to understand the mathematical shapes by using analytical geometry. gFKiwtbtpaypy; fzpjtbtq;fis gad;gLj;Jtij fbdkhf czUfpNwd;.		

SECTION –C

Sl.No	Statements	Yes	No
1	I find it easy and interesting to learn the theorems proved by mathematicians. fzpjtpay; mwpQHfspd; ngahpy; tUk; Njw;wq;fis MHtKld; gbf;fpNwd;.		
2	I find it difficult to prove the theorems. Njw;wq;fis ep&gpj;jiy fbdkhf czUfpNwd		
3	;.I would like to learn the theorem by using discussion method. fye;Jiuahly;; Kiwapy; Njw;wq;fis ep&gpj;jiy tpUk;GfpNwd;.		
4	I find it difficult to find solution for the problems by using theorems. Njw;wq;fis gad;gLj;jp jPHTfhz;gij fbdkhf czUfpNwd;.		
5	I am interested to learn congruent shapes using theorems. rHtrk tbtq;fis Njw;wq;fspy; gad;gLj;Jtij MHtKld; fw;fpNwd;.		
6	While I try to prove the theorems, I find it difficult to prove theorems by using basic rules.		

	Njw;wq;fis ep&gpf;Fk; NghJ mbg;gil tpjpfis gad;gLj;Jtij fbdkhf czUfpNwd;.		
7	I would like to learn angel bisector using theorems. Njw;wq;fspy; Nfhz ,Urkntl;bfisfw;gijtpUk;GfpNwd;.		
8	I find it difficult to understand the uses of theorems. Njw;wq;fspd; gad;fis Ghpe;Jnfhs;tij fbdkhf czUfpNwd;.		
9	I am interested to learn similar triangles using theorems. rHtrk Kf;Nfhzq;fis Njw;wq;fspy; gad;gLj;Jtij MHtKld; fw;fpNwd;.		
10	I am confused in proving the different methods in theorems. Njw;wq;fis epUgpfFk; NghJ gy;NtW Kiwfis gad;gLj;Jtjpy; Fog;gkilfpNwd;.		
11	I am interested to learn circles using theorems. Njw;wq;fspy; glq;fis gad;gLj;Jtij MHtKld; fw;fpNwd;.		
12	I find it difficult to understand the theorems. Njw;wq;fis Ghpe;J nfhs;tij fbdkhf czUfpNwd;.		
13	I would like to tangents by using theorems. Njw;wq;fspy; njhLNfhLfis gad;gLj;jp epUgpj;jiy tpUk;GfpNwd;.		
14	I find it difficult to use figures in theorems. Njw;wq;fspy; glq;fs; gad;gLj;Jtij fbdkhf czUfpNwd;.		
15	I am interested to learn triangle inequality by having theorems. Njw;wq;fspy; Kf;Nfhz rkdpia gad;gLj;Jtij MHtKld; fw;fpNwd;.		
16	To prove one theorem I feel that it is difficult to use more than one theorem. xUNjw;wj;ij ep&gpf;f xd;Wf;F Nkw;gl;l Njw;wq;fis gad;gLj;Jtij fbdkhf czUfpNwd;.		
17	I feel that it is easy to learn combinations of solids by using theorems. Njw;wq;fspy; jplcUtq;fspd; njhlHGfis fw;gij vspjhf czUfpNwd;.		
18	I am confused to find out relationship between the theorems.		

	Njw;wq;fspd; njhlHGfismwptjpy; Fog;gkilfpNwd;.		
19	I would like to learn cyclic quadrilateral by using theorems. Njw;wq;fspy; tl;lehw;fuq;fisg; gad;gLj;jp fw;gij tpUk;GfpNwd;		
20	I find it difficult to using theorems for applied mathematics. gad;ghl;Lfzpjj;jpy; Njw;wq;fis gad;gLj;Jtij fbdkhf czUfpNwd;.		

SECTION-D

Sl.No	Statements	Yes	No
1	I would like to change the statements into symbolic form. fzpjf; fUj;Jf;fis FwpaPLfshf khw;wp fw;gij tpUk;GfpNwd;.		
2	I find it difficult to understand of analytical geometry. gFKiwtbtpay; fUj;Jf;fis Ghpe;J nfhs;tij fbdkhf czUfpNwd;.		
3	I would like to learn the inductive method in analytical geometry. gFKiwtbtpaypy; tpjptUKiwiag; gad;gLj;jp fw;gij tpUk;GfpNwd;		
4	I find it difficult to compare the common properties of mathematical shapes in analytical geometry. gFKiw tbtpaypy; fzpj tbtq;fspd; nghJgz;Gfis xg;gpLtij fbdkhf czUfpNwd;.		
5	I would like to interested to learn demonstrations in analytical geometry. gFKiwtbtpay; fUj;Jfis nra;Jfhl;ly; Kiwapy; tiuglq;fis fw;gij tpUk;GfpNwd;.		
6	I find it difficult to understand the concept of objects in analytical geometry. gFKiwtbtpaypy; nghUl;fs; gw;wpa fUj;Jf;fis Ghpe;Jnfhs;tij fbdkhf czUfpNwd;.		
7	I am interested to learn concept maps in analytical geometry. gFKiwtbtpaypy; nghJikfUj;J tiuglq;fis fw;gij tpUk;GfpNwd;.		

8	I get confused to compare more than two concepts of mathematical shapes in analytical geometry. fzpjtbtq;fspd; ; ,uz;bw;F Nkwgl;l fUj;Jf;fis xg;gpLtjpy; Fog;gkilfpNwd;.		
9	I would like to compare the concept in formal level. FwpaPLfs; topNa fUj;Jfis mikf;Fk; Kiwia tpUk;GfpNwd;.		
10	I get confused to learn the concept of mathematical relations. fzpjtpay; njhlHGfs; gw;wpa fUj;Jfspy; Fog;gkilfpNwd;.		
11	I am interested to study the concept of centroid in discovery approach. ikaNfhLfis fz;lwpAk; Kiwapy; MHtKld; fw;fpNwd;		
12	I find it difficult to learn the understand the concept of construction in analytical geometry. gFKiwtbtpay; fUj;jpay; mikg;gpid fbdkhf czUfpNwd;.		
13	I feel that it is easy to learn the concept of generalization in an analytical geometry gFKiwtbtpaypy; fUj;Jfis xd;WgLj;jp fw;gij vspjhf czUfpNwd;.		
14	I get confused to learn the concept of aspect in analytical geometry. gFKiwtbtpaypy; nghUl;fspd; $whd njhlHGfis gw;wpa fUj;Jfspy; Fog;gkilfpNwd;.		
15	I would like to learn the concept of logical problem by using heights an distances. jUf;fhPjpapy; J}uq;fis gad;gLj;jp fw;gij tpUk;GfpNwd;.		
16	I feel that it difficult to understand the concept of abstraction in analytical geometry. gFKiwtbtpaypy; nghJikg; gphpj;jy; fUj;Jfisg; Ghpe;J nfhs;tij fbdkhf czUfpNwd;.		
17	I am interested to study the concept of sphere in problem solving approach. Nfhsj;jpd; fUj;Jf;fis jPHTfhZk; Kiwapy; MHtKld; gbf;fpNwd;.		
18	I feel that it difficult to form the concept of hyperbola in		

	analytical geometry. gFKiwtbtpaypy; mjpgutisaj;jpd; fUj;Jfis cUthf;Ftij fbdkhf czUfpNwd;.		
19	I feel that it is easy to learn the concept of straight lines by using applied mathematics. gad;ghl;Lf; fzpjj;jpy; NeHNfhLfis gad;gLj;jp fw;gij vspjhf czUfpNwd;.		
20	I get confused to learn the concept of chaining in analytical geometry. gFKiwtbtpaypy; nrhw;fis ,izj;Jf; fw;wy; fUj;Jfspy; Fog;gkilfpNwd;		

APPENDIX – C

PROBLEM FACED BY HIGH SCHOOL STUDENT IN LEARNING ANALYTIC GEOMETRY IN MATHEMATICS

Questionnaire – (Final)

(Prepared by R.Rajendran&Mr.K.GireeshKumar)

(2013-2014)

Instructions:

Certain questions related in the problems faced by students in learning analytic geometry are given below. Read carefully each questions and put a tick mark (✓) against Yes/ No. Attend all questions without any omission and your response will be kept confidential and be used for research purpose only.

SECTION - A

Sl. No	Statements	Yes	No
1	I .feel very interested to do the problems for equations for circles. tl;lq;fspd; rkd;ghLfSf;Fj; jPHT fhz;gij MHtKld; fw;fpNwd;.		
2	I find it difficult to memorize the equations for the analytical geometry problem. gFKiwtbtpaypy; fzf;FfSf;Fj; jPHTfhZk; NghJmbg;giltiuaiwfis epidTf;F nfhz;L tUtij fbdkhf czUfpNwd;.		
3	I find it difficult to classify the types of parabola. gutisaj;jpd; tiffis tifg;gLj;Jtij fbdkhf czUfpNwd;.		
4	;.I would like to learn direction ratio's in analytical geometry. gFKiwtbtpaypy; jpirf; nfhird;fisg; fw;gij tpUk;GfpNwd.;		
5	I am confused in doing the problems of slope of lines. NfhLfspd; rha;Tfis fzf;fpLtjpy; Fog;gkilfpNwd		
6	I like to solve the problems of angles between two straight lines. ,uz;L NeHf;NfhLfSf;F ,ilg;gl;l Nfhzq;fis kjpg;gpLtij tpUk;GfpNwd.;		

7	I find it difficult to understand the equation of tangent. njhLNfhLfspd; rkd;ghLfis Ghpe;Jnfhs;tij fbdkhf czUfpNwd;.		
8	I like to compare the applied mathematics with analytical geometry. gFKiwtbtpay; fzf;Ffis eilKiw fzf;FfSld; xg;gpl;L jPHT fhz;gij tpUk;GfpNwd		
9	I am confused while solving the same problem by using different problem solving methods. xNu khjphpahd fzf;FfSf;F gy;NtW jPHTfhZk; Kiwfis gad;gLj;Jtjpy; ehd; Fog;gkilfpNwd		
10	I am interested to do reasoning problems in analytical geometry. gFKiwtbtpaypy; fhuzkwpjy; tif fzf;FfSf;F jPHTfhz;gjpy; MHtk; fhl;LfpNwd;.		
11	I find it difficult to understand the definitions of analytical geometry. gFKiwtbtpay; tiuaiwfis Ghpe;Jnfhs;tij fbdkhf czUfpNwd;.		
12	I would like to solve the logical problems in analytical geometry. gFKiwtbtpaypy; jUf;fhPjpahd fzf;FfSf;F jPHTfhz;gij tpUk;GfpNwd;.		

SECTION – B

Sl.No	Statements	Yes	No
1	.I like to use the centroid in problem solving. jPHTfhzypy; ikaf;NfhLfis gad;gLtj;Jtij tpUk;GfpNwd;.		
2	I find it difficult to measure the readings of diagrams. glq;fspy; msTfisf; Fwpg;gpLtij fbdkhf czUfpNwd		
3	;.I think that the straight line figures make it easy to solve the slope and		

	intersect form. NeHNfhLfspd; rha;T kw;Wk; ntl;Lj;Jz;L fhz;gij vspjhf epidf;fpNwd;.		
4	I find it difficult to findout the area of triangle by using more than one figures. Kf;Nfhzj;jpd; gug;gsT fhz xd;Wf;F Nkw;gl;l glq;fis gad;gLj;Jtij fbdkhf czUfpNwd;		
5	I like to use figure in sector formula. tl;lf;Nfhzg; gFjpapd; tha;g;ghl;by; glq;fis gad;gLj;Jtij tpUk;GfpNwd;.		
6	I find it difficult to draw a diagram for incircle. gy;NtW tifahd NeHf;NfhLfspd; glq;fs; tiutJfbdkhf ,Uf;fpwJ.		
7	I like to used slight lines by solving angle of inclination. rha;TNfhzq;fSf;F jPHTfhz NeHf;NfhLfisg; gad; gLj;Jtij tpUk;GfpNwd;.		
8	I find it difficult to use the straight line by solving the problem of slope-Intercept form. rha;T- ntl;Lj;Jz;L mikg;ig gad;gLj;jp NeHNfhLfSf;Fj; jPHTfhz;gij fbdkhd czUfpNwd;.		
9	I feel that it is easy to find the solution of slopes by using parallel lines. ,izNfhLfisg; gad;gLj;jp rha;T fhz;gij vspjhf czUfpNwd;.		
10	I am confused to solve the nature of consistency by using triangle. jPHTfspd; xUq;fikj;jd;ikia fhz Kf;Nfhzj;ij gad;gLj;Jtij fbdkhf czUfpNwd;.		
11	I like to use the plane by solving collinearity of three points. %d;WGs;spfspd; xUq;fikj;jd;ikf;F jPHTfhz jsq;fisg; gad;g;gLj;Jtij tpUk;GfpNwd;.		
12	I find it difficult to understand the mathematical shapes by using analytical geometry. gFKiwtbtpaypy; fzpjtbtq;fis gad;gLj;Jtij fbdkhf czUfpNwd;.		

SECTION –C

Sl.No	Statements	Yes	No
1	I am interested to learn congruent shapes using theorems. rHtrk tbtq;fis Njw;wq;fspy; gad;gLj;Jtij MHtKld; fw;fpNwd;.		
2	While I try to prove the theorems, I find it difficult to prove theorems by using basic rules. Njw;wq;fis ep&gpf;Fk; NghJ mbg;gil tpjpfis gad;gLj;Jtij fbdkhf czUfpNwd;.		
3	I find it difficult to understand the uses of theorems. Njw;wq;fspd; gad;fis Ghpe;Jnfhs;tij fbdkhf czUfpNwd;.		
4	I am interested to learn similar triangles using theorems. rHtrk Kf;Nfhzq;fis Njw;wq;fspy; gad;gLj;Jtij MHtKld; fw;fpNwd;.		
5	I am confused in proving the different methods in theorems. Njw;wq;fis epUgpfFk; NghJ gy;NtW Kiwfis gad;gLj;Jtjpy; Fog;gkilfpNwd;.		
6	I am interested to learn circles using theorems. Njw;wq;fspy; glq;fis gad;gLj;Jtij MHtKld; fw;fpNwd;.		
7	I find it difficult to understand the theorems. Njw;wq;fis Ghpe;J nfhs;tij fbdkhf czUfpNwd;.		
8	I am interested to learn triangle inequality by having theorems. Njw;wq;fspy; Kf;Nfhz rkdpia gad;gLj;Jtij MHtKld; fw;fpNwd;.		
9	To prove one theorem I feel that it is difficult to use more than one theorem. xUNjw;wj;ij ep&gpf;f xd;Wf;F Nkw;gl;l Njw;wq;fis gad;gLj;Jtij fbdkhf czUfpNwd;.		
10	I feel that it is easy to learn combinations of solids by using theorems. Njw;wq;fspy; jplcUtq;fspd; njhlHGfis fw;gij vspjhf czUfpNwd;.		
11	I am confused to find out relationship between the theorems. Njw;wq;fspd; njhlHGfismwptjpy; Fog;gkilfpNwd;.		
12	I would like to learn cyclic quadrilateral by using theorems. Njw;wq;fspy; tl;lehw;fuq;fisg; gad;gLj;jp fw;gij tpUk;GfpNwd;		

SECTION-D

Sl.No	Statements	Yes	No
1	I would like to learn the inductive method in analytical geometry. gFKiwtbtpaypy; tpjptUKiwiag; gad;gLj;jp fw;gij tpUk;GfpNwd;		
2	I find it difficult to understand the concept of objects in analytical geometry. gFKiwtbtpaypy; nghUl;fs; gw;wpa fUj;Jf;fis Ghpe;Jnfhs;tij fbdkhf czUfpNwd;.		
3	I am interested to learn concept maps in analytical geometry. gFKiwtbtpaypy; nghJikfUj;J tiuglq;fis fw;gij tpUk;GfpNwd;.		
4	I get confused to compare more than two concepts of mathematical shapes in analytical geometry. fzpjtbtq;fspd; ; ,uz;bw;F Nkwgl;l fUj;Jf;fis xg;gpLtjpy; Fog;gkilfpNwd;.		
5	I would like to compare the concept in formal level. FwpaPLfs; topNa fUj;Jfis mikf;Fk; Kiwia tpUk;GfpNwd;.		
6	I get confused to learn the concept of mathematical relations. fzpjtpay; njhlHGfs; gw;wpa fUj;Jfspy; Fog;gkilfpNwd;.		
7	I am interested to study the concept of centroid in discovery approach. ikaNfhLfis fz;lwpAk; Kiwapy; MHtKld; fw;fpNwd;		
8	I find it difficult to learn the understand the concept of construction in analytical geometry. gFKiwtbtpay; fUj;jpay; mikg;gpid fbdkhf czUfpNwd;.		
9	I feel that it is easy to learn the concept of generalization in an analytical geometry gFKiwtbtpaypy; fUj;Jfis xd;WgLj;jp fw;gij vspjhf czUfpNwd;.		
10	I feel that it difficult to form the concept of hyperbola in analytical geometry. gFKiwtbtpaypy; mjpgutisaj;jpd; fUj;Jfis cUthf;Ftij fbdkhf czUfpNwd;.		

11	I feel that it is easy to learn the concept of straight lines by using applied mathematics. gad;ghl;Lf; fzpjj;jpy; NeHNfhLfis gad;gLj;jp fw;gij vspjhf czUfpNwd;.		
12	I get confused to learn the concept of chaining in analytical geometry. gFKiwtbtpaypy; nrhw;fis ,izj;Jf; fw;wy; fUj;Jfspy; Fog;gkilfpNwd;		