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Budha Dal Public School,Patiala

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[LESSON PLAN OF CLASS XI (MATHS) (TERM – I)]

Chapter – 1

Sets

Objectives:

Students will be able to

- Define set
- Represent set in roaster and set builder form
- Give subsets of given sets
- Draw and use venn diagrams

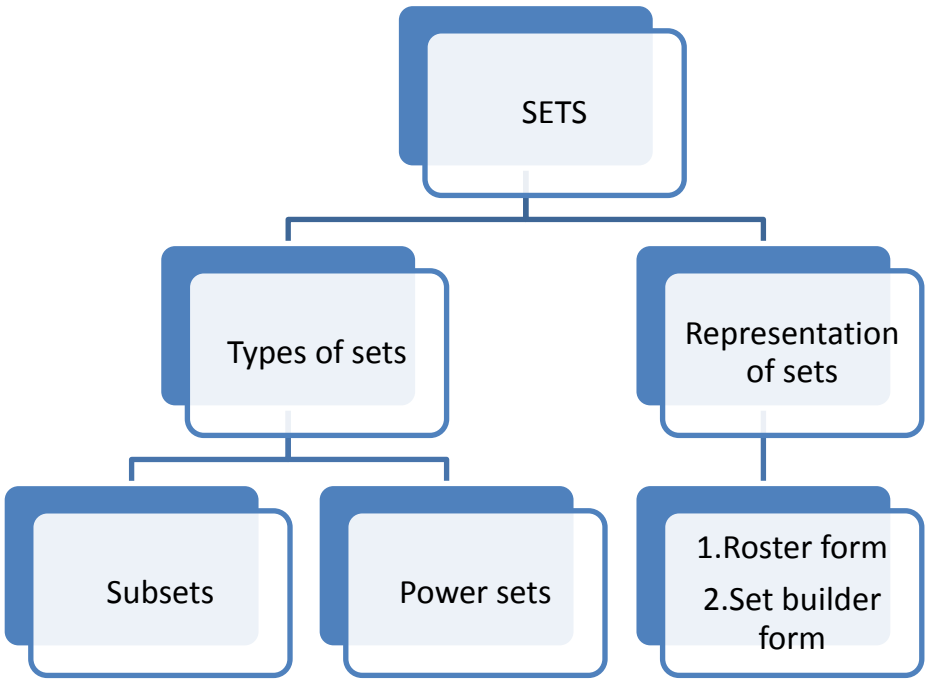
P.K.Testing:

- What a particular name can be given to all counting numbers?
- What can we say to a particular colletion of objects?

Innovative methods: An activity to find the number of subsets in a given set will be done.

Vocabulary and important spellings used: Roster form,Set builder form, Subsets,Union and Intersection of sets, Venn diagram.

Concept Mapping:



Procedure:

Teacher will introduce the chapter by giving real life examples of sets like setof same crockery.

Then methods of representing sets will be explained:

1. Roster form
2. Set builder form

Q: Write the set A = { x : x is an integer, $-1 < x < 4$} in roster form .

Sol: The required numbers are 0,1,2,3.So,the given set in the roster form is {0,1,2,3}

Q: Write the set A= { 1,4,9,16,25….} in set-builder form.

Sol: A = {x: $x = n^2$, where n is set of natural numbers}

Then teacher will explain types of sets:

1. Empty sets: A set which does not contain any element is called the ***empty set.***
2. Finite and Infinie sets: A set which is empty or contain a definite number of elements is called ***finite*** otherwise,the set is called ***infinite***.
3. Equal sets: Two sets A and B are equal if they have exactly the same elements.
4. Subsets: A set A issaid to be subset of B if every element of A is also an element of B.
5. Power set : The collection of all subsets of set A is called ***power set*** of A. It is denoted by P(A).

OPERATION ON SETS:

1. Union of sets: Let A and B be two sets. The union of A and B is the set which consists of all the elements of A and B. Symbolically it is written as $\boldsymbol{A \cup B}$.
2. Intersection of Sets: The intersection of two sets A and B is the set of all those elements which belong to both A and B. Symbolically it is written as $\boldsymbol{A \cap B}$.
3. Difference of sets: The difference of the sets A and B in this order is the set of elements which belong to A but not to B. Symbolically we write it as $\boldsymbol{A - B}$.

4. Complement of a set: Let U be the universal set and A be any subset of U,then the complement of A is the set of all elements of U which are not elements of A.

ERROR ANALYSIS

ERRORS	REMEDIAL MEASURES
1.Confusion in using belongs to and subset	Belongs to be used between an element and a set. Subset is used between sets.
2.sets are denoted by small letters	To insist that capital letters only denote a set And small letters for elements of a set
3.AU(B ∩ C) = (AUB) ∩ C	Associate and Distributive formulae should be well versed.
4.While solving practical problems on sets, students neglect n(A ∩ B) and in Venn diagram representation too.	Illustrations through Venn diagrams will help to overcome this problem.

Recapitulation:

1) Write the set A = { x : x is an integer, $-1 < x < 4$} in roster form
2) Write { x : $-3 < x < 7$} as an interval.
3) Write all the possible subsets of A = {5,6}.
4) In a class of 50 students, 30 students like Mathematics, 25 like Science and 16 like both. Find the number of students who like i) either mathematics or science ii) neither Mathematics nor Science.

Art Integration:Figures and computer

Learning Outcomes:

Upon successful completion of Sets students should be able to:

1. Identify set, object and roster notation.

2. Determine if a given set is finite or infinite.

3. Determine if two are more sets are equal by examining their elements.

4. How to represent a set diagrammatically by using Venn diagram

5. Verification of laws by using Venn diagram.

6. Finding sub sets of a given set.

7. Understanding universal set, complement set.

8. Intersection, union and difference of two sets.

9. Using laws solving problems.

Resources: Mathematics text book for Class XI by NCERT, Reference book by Dr.R.D.Sharma

Link Used: SETS: www. mathxtc.com

Assesment: Test consist of following questions will be conducted:

1) In a group of 800 people, 500 can speak Hindi and 320 can speak English. Find (i) How many can speak both Hindi and English? (ii) How many can speak Hindi only?
2) A survey shows that 84% of the Indians like grapes, whereas 45%like pineapple. What percentage of Indians like both grapes and pineapple?
3) In a survey of 100 peoples it was found that 28 read magazine A, 30 read magazine B, 42 read magazine C, 8 read magazine A and B, 10 read magazine A and C, 5 read Magazine B and C and 3 read all three magazines. Find.(i) How many read none of the three magazine? (ii) How many read magazine C only?
4) Let A, B be any two sets. Using properties of sets prove that, (i) $(A - B) \cup B = A \cup B$ (ii) $(A \cup B) - A = B - A$ [Hint : $A - B = A \cap B'$ and use distributive law.]
5) If $\mu=\{1,2,3,4,5,6,7,8,9\}$, $A = \{2,3,5,7,9\}$, $B = \{1,2,4,6\}$, verify (i) $(A \cup B)' = A' \cap B'$ (ii) $B - A = B \cap A' = B - (A \cap B)$.

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Chapter –2

Relation and Functions

Objectives:

The students should be able to

- Define Cartesian product of sets
- Define a relation and fuction.
- Distinguish between different types of relations.

P.K.Testing: Students will be asked about sets and different types of sets.

Innovative Methods: An activity to distinguish between relation and function will be done.

Vocabulary and Important spellings: Relation, Functions and Cartesian product.

Procedure: Teacher will start the chapter by giving real life examples of relations like brother-sister, mother – father etc. and then students will learn to link pairs of objects from two sets and then introduce relation between two objects in pair. After that teacher will explain the mathematical definitions :

Cartesian Product: Given two non empty sets A and B. The Cartesian product A X B is the set of all ordered pairs of elements from A to B.

Relation: A relation R from a non-empty set A to a non empty set B is a subset of the Cartesian product A X B.

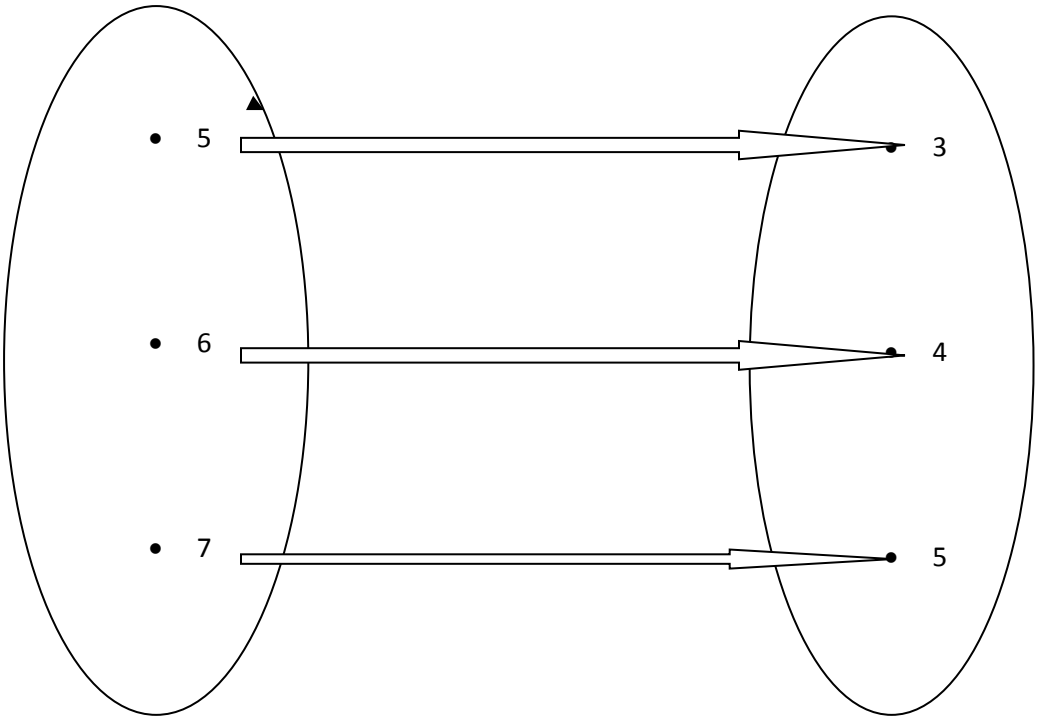
Domain: The set of all first elements of the ordered pairs in a relation R from a set A to B is called *domain* of relation R.

Range: The set of all second elements in a relation R from a set A to B is called *range* of the relation R. The whole set B is called *co-domain* of relation R. **Range ⊆ co-domain.**

Q: The following figure shows a relation between sets P and Q. Write this relation in

i) Set-builder form
ii) Roster form
iii) Define its domain and range.

Sol: P Q



Sol: i) R = {(x,y): y = x – 2, for x = 5,6,7}

ii) R = {(5,3),(6,4),(7,5)}

iv) Domain = {5,6,7}
Range = {3,4,5}

Functions: A relation f from a set A to a set B is said to be function if every element of A has one and only one image in set B. Then type of functions will be discussed.

Error Analysis:

ERRORS	REMEDIAL MEASURES
confusion in the range and the codomain	Insist range always a subset or a set equal to the co-domain
. Confusion between the relation and the function.	Function is a particular case of the relation.

Student participation: Students will solve the sum given by the teacher and will find the real life examples of relation and functions.

Recapitulation:

1. Find a and b if (a – 1, b + 5) = (2, 3)

2. If A = {1, 3, 5}, B = {2,3}, find : a).A × B b).B × A

3. Let A = {1,2}, B = {2,3,4}, C = {4,5}, find a).A × (B U C) b).A × (B C)

4. If P = {1,3}, Q = {2,3,5}, find the number of relations from A to B

5. If A = {1,2,3,5} and B = {4,6,9}, R = {(x, y) : |x – y| is odd, x A, y B} Write R in roster form

6. Which of the following relations are functions. Give reason. R = { (1,1), (2,2), (3,3), (4,4), (4,5)} R = { (2,1), (2,2), (2,3), (2,4)} R = { (1,2), (2,5), (3,8), (4,10), (5,12), (6,12)}

Art Integration: Figures and computer.

Learning Outcomes:

The students should be able to

•Distinguish between different types of relations.

• Define a function and a real valued function.

• Differentiate between a relation and a function.

• Distinguish between different types of functions.

• Identify Domain, Co-Domain and range of various relations. Draw the graphs of identity function, greatest integer function, modulus function, Signum function, constant function.

Resources: Mathematics text book for Class XI by NCERT,Reference book by Dr.R.D.Sharma

Link Used: Relations and functions : http // www.taosschools.org

Assesment:

1. Find the domain of the following functions: a. F(x) = IxI b. F(x) = $\sqrt{16 - x^2}$

2. Find the range of the following functions: a. F(x) = 2+3x, x ∈ R, x> 0 b.. F(x) = x ,

$x \in R$

3. Find the domain of the function f(x) = $\sqrt{x-1}$

4 . If f,g: R R be defined by f(x) = x+ 1 ,g(x) = 2x + 3 ,find a. f+ g b. f-g c. f. g d. .$\frac{f}{g}$

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Chapter –3

Trignometric Functions

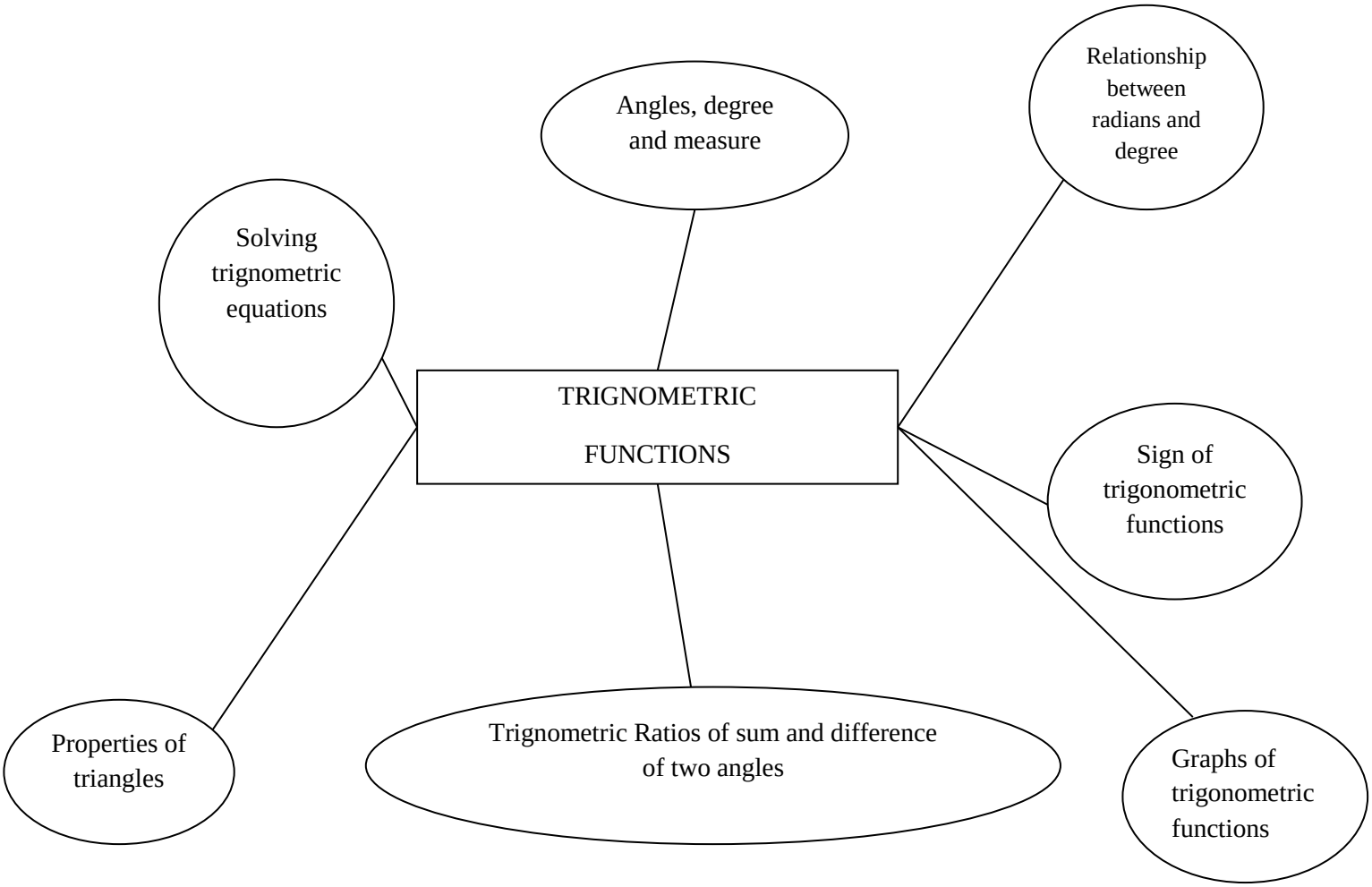
Objectives: Students will be able to:

- Measure angles in degrees and radians
- Solve trigonometric equations using identities.

P.K.Testing: Students will be asked about different trigonometric functions.

Innovative Method: To find the values of Sine and cosine functions in 2^{nd} ,3^{rd} and 4^{th} quadrants by using their given values in 1^{st} quadrant.

Conceptual Mapping:



Procedure: Introduction will be started with meaning of Trignometry, positive and negative angles, measuring of angles in radians, degrees and conversion from one measure to another will be explained.

Definition of trigonometric functions, domain ,range and signs of trigonometric functions will be explained with its graphs.

Then students will be explained all important results of trigonometry that will help them to solve trigonometric equations.

Recapitulation:

1.Convert the radian measure into degree measure: $\frac{7\pi}{6}$

. 2. Find the radius of the circle in which a central angle of intercepts an arc of 37.4 cm length (use $\pi = \frac{22}{7}$).

3.If tan x = $\frac{-5}{12}$ and x lies in the second quadrant, find the values of other five trigonometric functions.

Art Integration: Figures and computer.

Learning Outcomes:

The students should be able to

- Solve trigonometric equations
- Convert one system of angle into another

Resources: Mathematics text book for Class XI by NCERT,Reference book by Dr.R.D.Sharma

Link Used: Trigonometry: www.powershow.com

Assesment:

1) Solve : 4 Sin x Cos x + 2 Sin x + 2 Cos x +1 =0.

2)In any Triangle ABC, prove that a = b Cos c + c Cos b

3)Find the general solution of the equation : Cos 4x = Cos 2x

4) Solve: 4 Sin x Cos x +2 Sin x + 2 Cos x + 1 = 0.

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Chapter - 4

Principle of Mathematical Induction

Objectives: Students will be able to:

a) Define PMI
b) Conclude that P(n) is true for all n

P.K.Testing: Students will be asked about instances when one thing happens then others also happens.

Vocabulary and Important spellings: Induction, Deduction

Procedure: Teacher will start explaining the method by giving an example:

At a bicycle stand , when one bicycle falls, all other falls one after the other. Why this happens?

This is because each falling bicycle induces movement in the bicycle next to it.

Such a reaction leads to the principle of **" *Mathematical Induction"***

The Principle of Mathematical Induction:

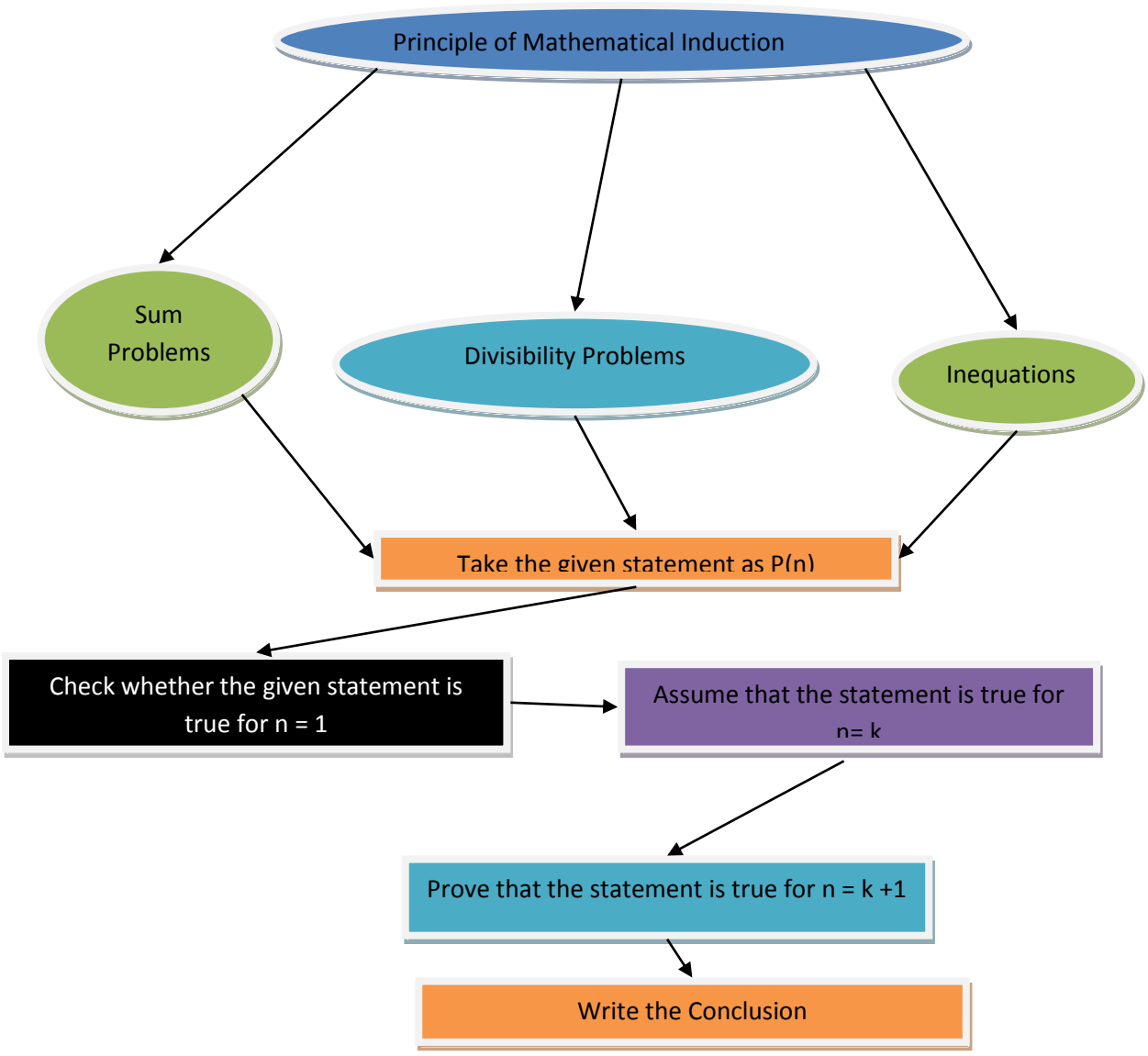
Suppose there is a given statement P(n) involving the natural number n such that

1. *The statement is true for n = 1, i.e. P(1) is true, and*
2. *If the statement is true for n = k(where k is some positive integer),then the statement is also true for n= k+ 1i.e., truth of P(k)implies the truth of P(k+1).*

Then, P(n) is true for all natural numbers.

ERRORS	REMEDIAL MEASURES
Not defining P(n)	Define P(n) positively and proceed
Not testing for P(1)	It is must to test for P(1)
Errors in simplifying $P(k+1)$in theprocess of using P(k)	Enough Practice should be given

Conceptual Mapping:



Recapitulation: Teacher will ask following questions:

Using the principle of mathematical induction, prove the following for all n∈ N:

1. 1+3+5+--------- + (2n-1) =n^2

2. n^2 +n is an even natural number.

3. $3^n > n$

Learning Outcomes:

The students should be able to

• Define the statement of PRINCIPLE OF MATHEMATICAL INDUCTION

• Define the statement P(n).

• Prove that P(1) is true for all n N.

• Prove that P(k+1) is true whenever P(k) is true

.• Conclude that P(n) is true for all n N.

• Applies the principle of PMI to various problems.

• understand the meaning of Principle of Mathematical Induction.

• understand clearly each steps involved in different type of induction.

• know how to use induction in daily lives.

Resources: Mathematics text book for Class XI by NCERT, Reference book by Dr.R.D.Sharma

Link Used: www.xpowerpoint.com

Assesment:

Using the principle of mathematical induction prove the following for all n ∈ N:

1. $3.6 + 6.9 + 9.12 + ... + 3n\,(3n + 3) = 3n(n + 1)(n + 2)$

2. $x^{2n-1} - 1$ is divisible by $x - 1$, $x \neq 1$

3. If x and y are any two distinct integers then $x^n - y^n$ is divisible by $(x - y)$

4. $7^n - 3^n$ is divisible by 4.

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Chapter - 5

Complex Numbers and Quadratic Equations

Objectives: Students will be able to:

• Define a complex number as z = a + ib

• Represent the complex number in the polar form.

• Find the square root of the complex number.

P.K.Testing: Questions regarding quadratic equations and real numbers will be asked.

Innovative Method: An activity to interpret geometrically the meaning of $i = \sqrt{-1}$ and its integral powers will be done.

Procedure: Teacher will start the lecture with the need of complex numbers. Natural numbers, whole numbers, Integers, Real numbers will be explained and then how to solve

$x^2 + 1 = 0$ will be discussed. Then teacher will explain about our Imaginary number *i*

$$\sqrt{-1} = i$$

$$i^2 = -1$$

$$i^3 = -i$$

$$i^4 = 1$$

Algebra of Complex Numbers: Addition, Subtraction, Multiplication and division of complex numbers will be discussed with many examples.

Modulus and conjugate of a complex number: Let z = a+ib be a complex number. Then, the modulus of z, denoted by $|z|$,is defined to be the non negative real number i.e.

$$|z| = \sqrt{a^2 + b^2}.$$

Conjugate of a complex number: The conjugate of a z = a + ib is $\bar{z}$, where $\bar{z}$ = a –ib.

Multilicative Inverse: The multiplicative inverse of a non-zero complex number is given by

$$z^{-1} = \frac{\bar{z}}{|z|^2}.$$

Argand Plane and a Polar Representation: The Plane having a complex number assigned to each of its point is called *complex plane* or the *Argand Plane.* The x-axis and the y-axis in the

argand plane are called ,respectively, the *real axis* and the *imaginary axis* .The Polar representation of a complex number is given by z = r(cos$\theta + i\ sin\theta$) where r is modulus of z and $\theta\ is\ argument\ of\ z.$

Quadratic Equations: Solution of quadratic equations will be explained by Factorisation (middle term splitting) and general Expression method.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

Questions related to above method will be discussed.

ERRORS	REMEDIAL MEASURES
In z = a + ib, Im(z) = ib	Emphasis should be given on real and imaginary parts
$\sqrt{-x} = -\sqrt{x}$	Identification of real and complex numbers should be clear
$\lvert z_1 + z_2 \rvert = \lvert z_1 \rvert + \lvert z_2 \rvert$	Explanation with counter examples.

Recapitulation: Teacher will ask following questions:

1. Find values of x and y if, (3x – 7) + 2iy = –5y + (5 + x)i
2. Find the modulus of z = 3 – 2i
3. Find the multiplicative inverse of (5 + 3i)
4. Find the solution of the equation $x^2 + 5 = 0$ in complex numbers.
5. If z is a purely imaginary number and lies on the positive direction of y-axis, then what is the argument of z?
6. Express in the form of(a + ib): i^{19}
7. Solve $21x^2 - 28x + 10 = 0$

Learning Outcomes:

The students should be able to

• Define a complex number as z = a + ib

• Represent a complex number geometrically on an Argand plane.

• Verify the properties of addition, subtraction, multiplication, division of complex numbers.

• Find the conjugate, modulus, inverse of a complex number

• Represent the complex number in the polar form.

• Find the square root of the complex number.

Resources: Mathematics text book for Class XI by NCERT,Reference book by Dr.R.D.Sharma

Link Used: www.authorstream.com

Assesment:

1. Convert the complex number z = 4(cos 60 – isin60) to rectangular or polar form.

2. Convert the complex number z = 2 - $2\sqrt{3}$i to polar form

3. Find the multiplicative inverse of $\frac{1}{6+4i}$.

4. Find the conjugate of $\frac{2}{3+4i}$

5. Find the modulus of -2 -3i.

6. Find the modulus and the argument of $\frac{1}{1+i}$.

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Chapter –6

Linear Inequalities

Objectives:

The students should be able to

1. Define an inequality.

2.Differentiate in equations and equations

3. Identify various types of inequalities.

P.K.Testing: Studendts will be asked about the simple equations , how the equations are equal, about the signs of < , > etc.

Innovative Method: An activity that the graph of a given inequality represents only one of the two half planes.

Procedure: Two real numor two algebraic expressions related by symbols < , > , $\leq$, $\geq$ form an inequality. E.g. $3x + 4 > 0$, $50-02x < 0$

The inequalities of the form :

$ax + b > 0$, $ax + b < 0$, $ax+ b \leq 0$, $ax + b \geq 0$ are inequalities in one variable and

$ax + by > 0$, $ax + by < 0$, $ax+ by \leq 0$, $ax + by \geq 0$ are inequalities in two variables.

Rules for solving an Inequality:

1. Equal numbers may be added to both sides of an inequality without affecting the signs of inequality.
2. Equal numbers may be subtracted to both sides of an inequality without affecting the signs of inequality.
3. Both sides of an Inequality can be multiplied by the same positive number. But in case of negative number sign of inequality changes.
4. Both sides of an Inequality can be divided by the same positive number. But in case of negative number sign of inequality changes.

Few examples from the Ex-6.1 will be discussed.

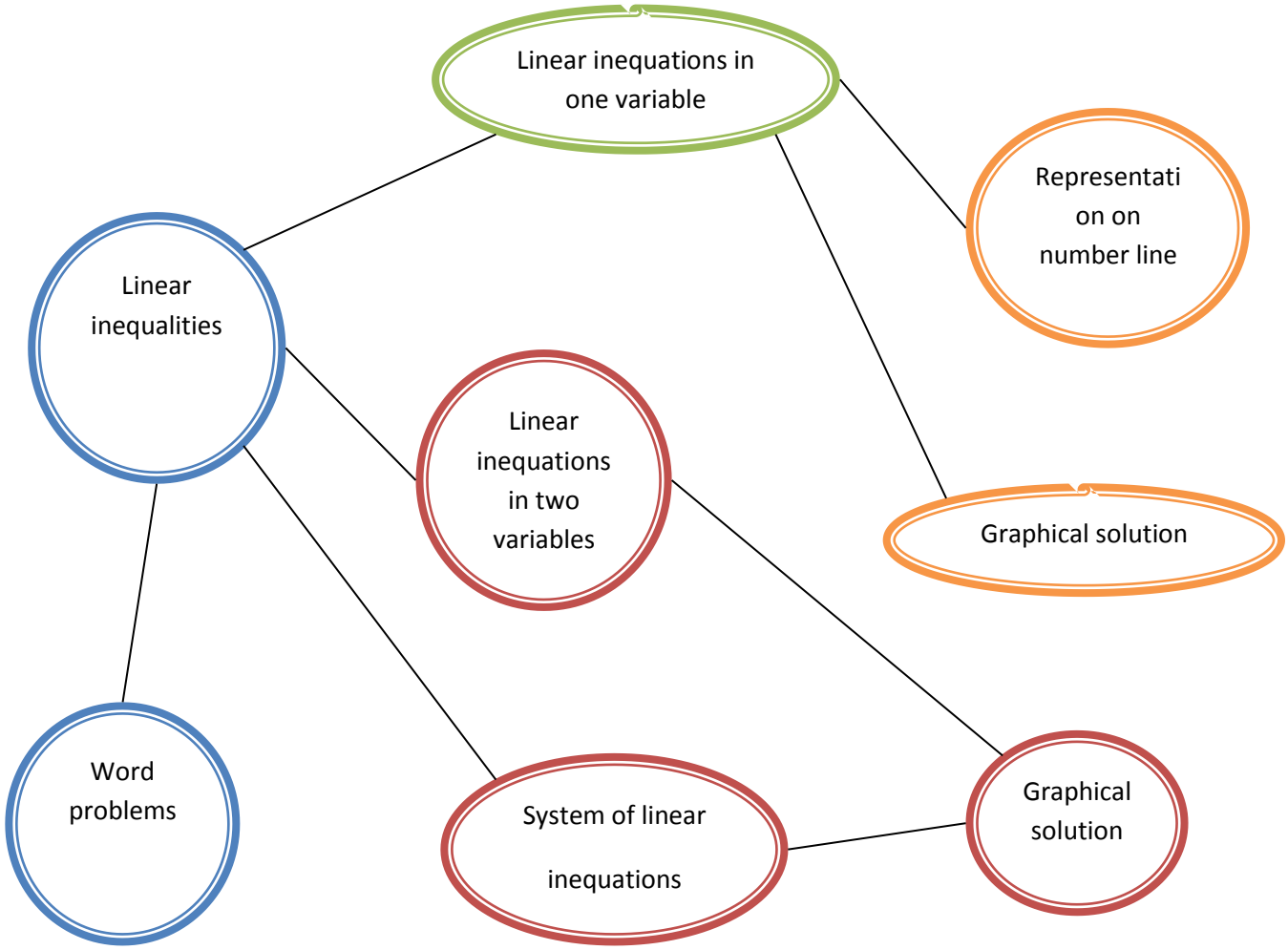
Solve -12x > 30 i) x is a natural number ii) x is an integer

Sol: Divide both sides of the equation by -12

$x < \frac{-30}{12}$ or $x < \frac{-5}{2}$

i) $x \in \emptyset$ ii) x = {_ _ _ _ _,-5,-4,-3}

Conceptual Mapping:



Recapitulation:

1. Solve the inequality,3x – 5 < x+7,when i) x is a natural number ii) x is a whole number iii) x is an integer iv) x is a real number

2. Solve the inequality $|x + 3| \geq 0$

3. The cost and revenue functions of a product are given by C(x)=20x+4000 and R(x)=60x +2000 respectively, where x is the number of items produced and sold. How many items must be sold to realize some profit?

4. Solve $4x+3 \geq 2x+17$

Learning out comes :

The students should be able to

1. Define an inequality.

2. Differentiate in equations and equations

3. Identify various types of inequalities. (Numerical inequalities, Literal inequalities. Double inequalities, Slack inequities, linear inequalities in one variable, linear inequalities in two variables x and y, system of linear inequalities in two variables)

4. Solve the in equations Algebraically and graphically.

5. Apply their knowledge and understanding in solving the Application of inequalities in the present day situations .

Resources: Mathematics text book for Class XI by NCERT,Reference book by Dr.R.D.Sharma

Link Used: Linear inequalities: mathxtc.com/…/numba Alg/files
www.powershow.com/view/graphing linear inequalities

Assesment:

1. Solve the inequality $\frac{x-2}{x+5} > 2$

2. Solve $1 \leq |x-2| \leq 3$

3. Solve the system of inequalities: $\frac{x}{2x+1} \geq \frac{1}{4}, \frac{6x}{4x-1} < \frac{1}{2}$.

4. Solve for x, $|x-3| \leq 5, |x| \geq 2$

5. Solve the following system of equations graphically $2x + y \geq 4, x + y \leq 3, 2x - y \leq 6.$

6. If a young man rides his motor cycle at 25 km per hour, he has to spend 2Rs per km on petrol and if he rides it at 40 km per hour, the petrol cost rises to Rs5 per km. He has Rs100 to spend on petrol and wishes to find the maximum distance he can travel within 1 hour. Formulate the data in the form of in equations. Which mode of transport you will suggest to a student and why?

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Chapter –7

Permutation and Combinations

Objectives:

The students should be able to

1. Students are able to solve the problems by using Fundamental principle of counting

2.Students understand Permutation as an arrangement and apply their knowledge in solving problems

3. Students can differentiate permutation and combination and can apply in solving problems.

P.K.Testing: Students will be asked about the simple questions regarding making Combinations.

Procedure:

Permutations

The word Permutation will be explained as an arrangemet .e.g. There are three objects A,B,C then permutation of three objects taking two at a time are AB,BC,CA,BA,CB,AC i.e. 6.

Fundamental Principle of Addition: If one event can occur in m different ways and other event can occur in n different ways then the number of ways of occurrence of either the first or second event is (m + n). Many examples will be discussed in class.

Fundamental Principle of Multiplication: If an event can occur in m different ways , following with another event can occur in n different ways then total number of ways of occurrence of both events in the given order is m X n. Many examples will be explained.

Factorial Notation: n! $is\ called\ n\ factorial. n! = n(n-1)(n-2) \dots \dots \dots .3.2.1$

The number of permutation of n objects taken r at a time, $0 \leq r \leq n$.

$$^{n}P_{r} = n(n-1)(n-2) \dots \dots \dots \dots . (n-r+1)$$

Permutations when some of objects are similar: The number of permuation of n objects , taken all at a time when p of them are similar to one kind and q of them are similar to another kind and remaining are all different is given by $\frac{n!}{p!q!}$.

Circular Permutations:

- Number of permutations of n different objects in a circle is given by (n – 1)!
- Number of permutations of n objects in a circle p of them are similar of one kind and q of them are similar to another kind and remaining all are different is given by $\frac{(n-1)!}{p!q!}$.

Combinations: Each of different selections made by taking same or all of a number of objects, irrespective of their arrangements is called combination.

$^{n}C_r = number\ of\ combination\ of\ n\ different\ objects\ taken\ r\ at\ a\ time.$

Properties of $^{n}C_r$:

- $^{n}C_0 = {}^{n}C_n = 1$
- $^{n}C_r = {}^{n}C_{n-r}$
- $^{n}C_{r-1} + {}^{n}C_r = {}^{n+1}C_r$, $1 \leq r \leq n$
- $\frac{{}^{n}C_r}{{}^{n}C_{r-1}} = \frac{n-r+1}{r}$, $1 \leq r \leq n$
- $^{n}C_x = {}^{n}C_y$ implies x+ y = n or x = y.

Recapitulation: Teacher will ask following questions :

1. Three tourists A, B & C arrive in a city where there are four hotels. In how many ways can they take up their accommodation, each at a different hotel?

2. A Coin is tossed 3 times and the outcomes are recorded. How many possible outcomes are there?

3.Given 5flags of different colours , how many different signals can be generated if each signal requires the use of 2 flags one below the other?

4. In a class are 27 boys and 14 girls .the teacher wants to select 1boy and 1 girl to represent the class for a function. In how many ways can the teacher make this selection?

5. How many numbers are there between 99 and 1000 having 7 in the unit‘s place?

Learning Outcomes:

The students should be able to

1. Define an inequality.

2. differentiate in equations and equations

3. Identify various types of inequalities. (Numerical inequalities, Literal inequalities. Double inequalities, Slack inequities, linear inequalities in one variable, linear inequalities in two variables x and y, system of linear inequalities in two variables)

4. Solve the in equations algebraically and graphically.

5. Apply their knowledge and understanding in solving the Application of inequalities in the present day situations .

Resources: Mathematics text book for Class XI by NCERT,Reference book by Dr.R.D.Sharma

Link Used: :www.xpowerpoint.com/ppt/permutation.html

Assesment:

1. Find n, if P(n,4):P(n-1,3)=9:1

2. Find n if, C(n,7)=C(n,17).

3. Find x if $\frac{1}{7!} + \frac{1}{8!} = \frac{x}{9!}$

4. If C(n-1,r):C(n,r):C(n+1,r)=6:9:13, find n and r.

5. How many numbers greater than a million can be formed by using the digits 4,6,0,6,7,4,6?

6. A polygon has 44 diagonals, find the number sides of a polygon.

7. How many words each of 3 consonants and 2 vowels can be formed from the letters of the word INVOLUTE?

8. How many different arrangements of the letters of the word INDEPENDENCE can be formed so that vowels always occur together?

9. In how many ways can 5 boys and 3 girls be seated in a row, so that no two girls sit together?

10. The different permutations of all the letters of the word EXAMINATION are listed as in a dictionary. If these permutations are considered as words, how many words are there before the first word starting with E? 11

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Chapter –14

Mathematical Reasoning

Objectives:

1. Student will observe the difference between a sentence and a statement.
2. The student applies the above concepts in the validity of many mathematical statements.
3. They will apply the above concepts in Boolean algebra and in digital electronics.

P.K.Testing: In this we shall try to understand whether students have knowledge of using of words like AND,OR,IF,THEN etc.

Procedure:

Sentence: A sentence is called a mathematical acceptable statement if it is either true or false or both. E.g. The sum of two positive numbers is positive.

Negation of Statement: The denial of Statement is called negation of statement.

e.g. New Delhi is a city.

The negation of this statement is ***New Delhi is not a city.***

Compound Statements: It is made up of two or more statements.In this case,each statement is called a component statement. E.g. The sky is blue and the grass is green.

The component statements of above statement are: *The sky is blue.The grass is green.*

Quantifiers: Quantifiers are phrases like ***There Exists*** and ***For All.***

Implications:the statements with ***if-then,only-if*** *and* ***if and only if*** are implications.

Contrapositive and converse: Contrapositive and converse are certain other statements which can be formed from a given statement with ***if-then***.

Recapitulation: Teacher will ask following questions :

1. Which of the following sentences are statements? Give reasons for your answer.

(i) There are 35 days in a month.

(ii) Mathematics is difficult.

(iii) Answer this question.

(iv) The product of (–1) and 8 is 8.

2. Write the negation of the following statements:

(i) Chennai is the capital of Tamil Nadu.

(ii) All triangles are not equilateral triangle.

(iii) The number 2 is greater than 7.

(iv) Every natural number is an integer.

3. Find the component statements of the following compound statements and check whether they are true or false.

(i) Number 3 is prime or it is odd

(ii) All integers are positive or negative.

(iii) 100 is divisible by 3, 11 and 5.

4. Give three examples of sentences which are not statements. Give reasons for the answers.

Learning Outcomes:

1. Student will observe the difference between a sentence and a statement.

2. Student understands different types of statements.

3. They infer the validity of the statement through different methods.

4. The student applies the above concepts in the validity of many mathematical statements.

5. They will apply the above concepts in Boolean algebra and in digital electronics

Resources: Mathematics text book for Class XI by NCERT, Reference book by Dr.R.D.Sharma

Link Used: Mathematical reasoning: www.powershow.com/view1/1 dcb42-ZDC IZ/mathematical

www.slideworld.com/ppt slides.aspx/mathematical reasoning

Assesment:

1. Form the conjunction of the following simple statements: p: Dinesh is a boy q: Nagma is a girl

2. Express in English , the statement $p \rightarrow q$, where p: it is raining today ,q: $2+3 > 4$

3. Translate the following bi-conditional into symbolic form "ABC is an equilateral triangle if and only if it is equiangular"

4. Find whether the given statement is compound statement or not "2 is both an even number and a prime number".

5. Write the negation of the given statement: x+y = y+x and 29 is a prime number.

6. Given the statement: "No rich man is happy". Can you conclude that: (

i) Happy people are not rich. (ii) Men who are not rich are happy. (iii) Some rich men are happy.

7. Rewrite the given statement in the form of conditional statement: " When you sing , my ears hurt".

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Chapter –15

Statistics

Objectives:

1 Students will observe the dispersion of the raw data through Range.

2 Students will comprehend that there are also other types of measures of dispersion

3. They apply the above concepts in comparing the variability of 2 series.

P.K.Testing: Students will be asked the questions about mean, median and mode.

Procedure: Terms like data, range , bar graph ,histograms , grouped data , un grouped data , class size, limits, frequency polygons will be explained. Concept of Cumulative frequency called ogives will be explained.

Mean-Deviation: *For ungrouped or discrete data* there are two methods. One is

Mean deviation about mean = $\sum_{i=1}^{n} \frac{|x_i - \bar{x}|}{n}$, where $\bar{x} = mean$

Mean deviation about median = $\frac{1}{n} \sum_{i=1}^{n} \frac{|x_i - median|}{n}$

For Grouped data: mean deviation about mean is = $\frac{1}{N} \sum f_i |x_i - \bar{x}|$

Mean deviation about median is = $\frac{1}{N} \sum f_i |x_i - median|$

Limitations of mean deviation: In a series, where the degree of variability is very high,the median is not a representative central tendency. The sum of deviations from the mean is more than the sum of deviations from median.Therefore,mean deviation about the mean is not very scientific. This implies that we must have some other measure of dispersion.

STANDARD DEVIATION is such a measure of dispersion.

$$\text{S.D.} = \sigma = \sqrt{\frac{1}{n} \sum_{i=1}^{n} (x_i - \bar{x})^2}$$

$$\sigma = \sqrt{\frac{1}{N}\sum f_i(x_i - \bar{x})^2}$$

$$\sigma = \frac{1}{N}\sqrt{N\sum f_i u_i{}^2 - (\sum f_i u_i)^2} \text{ X h}$$

Variance is square of standard deviation.

Recapitulation: Teacher will ask the following questions:

1. Find the mean deviation from the mean for the following data:

11,13,4,7,8,6,15,14,3,19

2. Find the mean deviation from the median for the data:

3,3,5,9,10,12,12,12,18,21,21

3. Find the variance and standard deviation for the following data:

6,10,7,13,4,12,8,12

4. Calculate the standard deviation for the following distribution giving the age distribution of persons:

Age (in yrs) :	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No: of persons:	03	61	132	153	140	51	

5. Find the mean and standard deviation for the following data:

x:	92	93	97	98	102	104	109
f :	03	02	03	02	06	03	03

Expected learning outcomes

1 Students will observe the dispersion of the raw data through Range.

2 Students will comprehend that there are also other types of measures of dispersion.

3 Students will understand the formulae of mean deviation and standard deviation.

4. They will start calculating mean deviation and standard deviation.

5. They apply the above concepts in comparing the variability of 2 series .

Resources: Mathematics text book for Class XI by NCERT,Reference book by Dr.R.D.Sharma

Link Used: Statistics: www-psych.stanford.edu/-bigopp/statistics.ppt

Assesment:

1. The variance of 20 observations is 5. If each observation is multiplied by 2, find the variance of the resulting observations.

2. The mean and standard deviation of a group of 100 observations were found to be 20 and 3 respectively. Later on it was found that 3 observations were in correct, which were recorded as 21, 21 and 18. Find the mean and standard deviation if the incorrect observations were omitted.

3. The mean and standard deviation of 20 observations are found to be 10 and 2 respectively. On rechecking, it was found that an observation 8 was incorrect. Calculate the correct mean and standard deviation in each of the following cases: (i) If wrong item is omitted (ii) If it is replaced by 12

4. For the distribution $\Sigma(x-5) = 3$ and $\Sigma(x-5)2 = 43$, whose total number of items is 18, Find the mean and standard deviation.

5. If each of the observations p1, p2, p3, ..…pn is increased by 'q' where 'q' is a negative or positive real number , show that variance remains unchanged.

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