NORTH-EX PUBLIC SCHOOL(Session 2020-21)

CLASS 11

REVISION

WORKSHEEET NO:7

1. Operation on sets
   (a) **Union** of sets
   (b) **Intersection** of sets
2. Properties of operation of union of sets
3. Range and domain of relation.

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

Trigonometric Functions

- **Quadrant**:

$t-$ratios	I	II	III	IV
$\sin\theta = y$	$+$	$+$	$-$	$-$
$\cos\theta = x$	$+$	$-$	$-$	$+$
$\tan\theta = \frac{y}{x}$	$+$	$-$	$+$	$-$

Trigonometric Equations:

- **Principle Solutions**: The solutions of a trigonometric equation, for which are called the principle solutions.
- **General Solutions**: The solution, consisting of all possible solutions of a trigonometric equation is called its general solutions>
- **Some General Solutions**:
- $\sin x = 0$ gives $x = n\pi$, where $n \in Z$.
- $\cos x = 0$ gives $x = (2n + 1)\frac{\pi}{2}$, where $n \in Z$.
- $\tan x = 0$ gives $x = n\pi$
- $\cot x = 0$ gives $x = (2n+1)\frac{\pi}{2}$
- $\sec x = 0$ gives no solution
- $\cos ecx = 0$ gives no solution
- $\sin x = \sin y$ gives $x = n\pi + (-1)^n y$
- $\cos x = \cos y$, implies $x = 2n\pi \pm y$, where $n \in Z$.
- $\tan x = \tan y$ implies $x = n\pi + y$, where $n \in Z$.

- **Principle of Mathematical Induction**: The principle of mathematical induction is one such tool which can be used to prove a wide variety of mathematical statements. Each such statement is assumed as P(n) associated with positive integer n, for which the correctness for the case n = 1 is examined. Then assuming the truth of P(k) for some positive integer k, the truth of P (k+1) is established.
- **Working Rule**:
  Step 1: Show that the given statement is true for n = 1.
  Step 2: Assume that the statement is true for n = k.
  Step 3: Using the assumption made in step 2, show that the statement is true for n = k + 1. We have proved the statement is true for n = k. According to step 3, it is also true for k + 1 (i.e., 1 + 1 = 2). By repeating the above logic, it is true for every natural number.
- **Conjugate of a complex number**: Two complex numbers are said to be conjugate of each other, if their sum is real and their product is also real. Conjugate of a complex number $z = a + ib$ is $\overline{z} = a - ib$ i.e., conjugate of a complex number is obtained by changing the sign of imaginary part of z.
- **Modulus of a complex number**: Modulus of a complex number $z = x + iy$ is denoted by $|z| = \sqrt{x^2 + y^2}$.
- **Argument of a complex number** $x + iy$: Arg$(x + iy) = \tan^{-1}\frac{y}{x}$.

- **Representation of complex number as ordered pair**: Any complex number $a + ib$ can be written in ordered pair as (a, b), where a is the real past and b is the imaginary part of a complex number.
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(i) $z_1 + z_2 = (a + c) + i\,(b + d)$
(ii) $z_1 z_2 = (ac - bd) + i\,(ad + bc)$

- Division of a complex number: If $z_1 = a + ib$ and $z_2 = c + id$, then,

$$= \frac{ac + bd}{c^2 + d^2} + i\frac{bc - ad}{c^2 + d^2}$$

- For any non-zero complex number $z = a + ib\ (a \neq 0,\ b \neq 0)$, there exists the complex number $\frac{a}{a^2 + b^2} + i\frac{-b}{a^2 + b^2}$ denoted by $\frac{1}{z}$ or z^{-1}, called the multiplicative inverse of z such that

- **Polar form of a complex number**: The polar form of the complex number $z = x + iy$ is $r\left(\cos\theta + i\sin\theta\hat{A}\right)$, where $r = \sqrt{x^2 + y^2}$ (the modulus of z) and $\cos\theta = \frac{x}{r}, \sin\theta = \frac{y}{r},$. (θ is known as the argument of z. The value of θ, such that is called the principal argument of z.
- **Important properties**: (i) $|z_1| + |z_2| \geq |z_1 + z_2|$, (ii) $|z_1| - |z_2| \leq |z_1 + z_2|$
- **Fundamental Theorem of algebra**: A polynomial equation of n degree has n roots.

Quadratic Equation:

- **Quadratic Equation**: Any equation containing a variable of highest degree 2 is known as quadratic equation. e.g., $ax^2 + bx + c = 0$.
- **Roots of an equation**: The values of variable satisfying a given equation are called its roots. Thus, $x = \alpha$ is a root of the equation $p(x) = 0$ if $p(\alpha) = 0$.
- **Solution of quadratic equation**: The solutions of the quadratic equation $ax^2 + bx + c = 0$, where $a, b, c \in \mathrm{R},\ a \neq 0,\ b^2 - 4ac < 0,$ are given by $x = \frac{-b \pm i\sqrt{4ac - b^2}}{2a}$.

REVISION QUESTIONS

Q1. Let A={1,2} and B={3,4}. Find the number of relation from A to B.

Q2. Let A={1,2,3} , B={3,4} and C={4,5,6}. Find:

(i) Ax(B∩C) (ii) Ax(B∪C)

Q4. Convert $40^0 20^l$ into radians

Q5. Expand tan(x+y) and cot(x-y).

Q6. Write the principal solutions of the equation sinx=$\frac{\sqrt{3}}{2}$

Q7. Find the value of (-i)(2i)$(\frac{-1i}{8})^3$.

Q8. The marks obtained by a student in class XI in first and second terminal examination are 62 and 48 respectively. Find the minimum marks he should get in the annual examination to have an average of at least 60 marks.