CLASS-12

WORK SHEET **SUB. MATHS** **CHAPTER -1**

1-Let R be a relation in the set of natural numbers N defined by $R = \{(a, b) \in N \times N : a < b\}$. Is relation R reflexive? Give a reason.

2-State the reason for the relation R in the set {1, 2, 3} given by $R = \{(1, 2), (2, 1)\}$ not to be transitive.

3-Let $A = \{3, 4, 5\}$ and relation R on set A is defined as $R = \{(a, b) \in A \times A : a - b = 10\}$. Is relation an empty relation?

4-Let $f : R \to R$ is defined by $f(x) = |x|$. Is function f onto? Give a reason.

5-If $f : R \to R$ and $g : R \to R$ are given by $f(x) = \sin x$ and $g(x) = 5x^2$, find $gof(x)$.

6-If $R = \{(x, y) : x + 2y = 8\}$ is a relation on N, write the range of R.

7-Let $R = \{(a, a^3) : a$ is a prime number less than 5$\}$ be a relation. Find the range of R.

8-Prove that $f : R \to R$ given by $f(x) = x^3 + 1$ is one-one function.

9-Let $f : R \to R$ be defined by $f(x) = x^2$. Is f one-one?

10-Given $f(x) = \sin x$ check if function f is one-one for (i) $(0,\pi)$ (ii) $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$.

11-Let $A = \{a, b, c\}$ and the relation R be defined on A, as follows: $R = \{(a, a), (b, c), (a, b)\}$. Then, write minimum number of ordered pairs to be added in R to make R reflexive and transitive.

12-If $f(x)$ is an invertible function, find the inverse of $f(x) = \frac{3X-2}{5}$.

13-If $f : R \to R$, be defined by $f(x) = (4 - X^4)^{\frac{1}{4}}$, then find $(fof)(x)$.

14-Show that $f : R \to R$, given by $f(x) = x^2 + 1$ is not a one-one function.

15-Is $f : [0, 2\pi] \to R$, given by $f(x) = \cos x$, one-one?

16-If f is an invertible function defined as $f(x) = \frac{X-4}{4}$. , write $f^{-1}(x)$.

17-For the set A = {1, 2, 3}, define a relation R in the set A as follows: R = {(1, 1), (2, 2), (3, 3), (1, 3)}. Write the ordered pairs to be added to R to make it the smallest equivalence relation.

18-Let f and g be two real functions defined as $f(x) = 2x - 3$; $g(x) = \frac{3+X}{2}$. Find fog and gof. Can you say one is inverse of the other?

19-If $f(x) = 2x + 3$ and $g(x) = 3x - 9$, $x \in R$, find $(fog)(0)$.

20-Consider function $f : \left[0, \frac{\pi}{2}\right] \to R$, given by $f(x) = \sin x$ and $g : \left[0, \frac{\pi}{2}\right] \to R$, given by $g(x) = \cos x$. Show that f and g are one-one but $f + g$ is not one-one..

21-Let T be the set of all triangles in a plane with R a relation in T given by $R = \{(T_1, T_2) : T_1 \cong T_2\}$.

Show that R is an equivalence relation.

22-Show that the relation S in the set R of real numbers, defined as

$S = \{(a, b) : a, b \in R$ and $a \leq b^3\}$ is neither reflexive, nor symmetric, nor transitive.

23-Let $A \longrightarrow \{3\}$and $B = R \longrightarrow \{1\}$.Consider the function $f : A \longrightarrow B$ defined by $f(x)=\frac{X-2}{X-3}$.Show that f is one- one and onto . Hence , find f^{-1}.

24-Show that the function $f : R \longrightarrow R$ defined by $f(x) = \frac{x}{x^2+1}$, $\forall\ x \in R$ is neither one-one nor onto.

Check whether the relation R defined in the set {1, 2, 3, 4, 5, 6} as
$R = \{(a, b) : b = a + 1\}$ is reflexive, symmetric or transitive..What is the inverse of f ?

25-Every relation which is symmetric and transitive is reflexive also. State true or false.

26-Let R be a relation in set N, given by
$R = \{(a, b) : a = b - 2, b > 6\}$ then $(3, 8) \in R$. State true or false with reason.

27-Let R be a relation defined as $R = \{(x, x), (y, y), (z, z), (x, z)\}$ in set $A = \{x, y, z\}$ then R is _______________ (reflexive/symmetric) relation.

28-The domain of the function $f : R \rightarrow R$ defined by $f(x) = \sqrt{4 - x^2}$ is ______.

29-Let $A = \{1, 2, 3, 4\}$ and $B = \{a, b, c\}$. Then number of one-one functions from A to B are ______.

30-Given a function 'f' as $f(x) = 5x + 4$, $x \in R$. If $g : R \rightarrow R$ is inverse of function 'f' then

(a) $g(x) = 4x + 5$ (b) $g(x) = \frac{5}{4x-5}$ (c) $g(x) = \frac{x-4}{5}$ (d) $g(x) = 5x - 4$

31-If $f(x) = \frac{x-1}{|x-1|}$, $x(\neq 1) \in R$ then range of 'f' is _____.