

SAINIK SCHOOL GOPALGANJ
SUB: MATHEMATICS
CLASS - XII
ASSIGNMENT

Lesson: 1: Relations & Functions

(Q1 to Q10) There are four options against each question. Choose the option which you consider the most appropriate as your answer.

1. Let R is a relation on set of \mathbb{N} as $R = \{ (a, b) : a = b - 2, b > 2 \}$ then
(a) $(2,4) \in R$ (b) $(3,8) \in R$ (c) $(6,8) \in R$ (d) $(8,7) \in R$
2. On set of all straight line in a plane relation R is defined as lR_m iff l is perpendicular to m the R is :
(a) Reflexive (b) symmetric (c) transitive (d) none
3. Let $f: \{ (x, x^2), x \in \{-1, 0, 1\} \}$ is
(a) one-one (b) onto (c) bijection (d) none
4. that an onto function from $\{ a, b, c \}$ to $\{ a, b, c \}$ is.
(a) always one one (b) never one one (c) may be one one (d) none
5. A relation $R = \{ (a, b) : a = b^2 \}$, then R is
(a) Reflexive (b) symmetric (c) Transitive (d) none of these
6. On the set of all citizens of India a relation R is defined as aR_b if a is at least 5 years younger than y, then R is
(a) Equivalence relation (b) Only symmetric (c) Only transitive (d) None
7. Relation # is defined on the set of all triangles in a plane as $\# = \{ (a, b) : a \text{ is similar to } b \}$ then # is
(a) Reflexive only (b) Symmetric only
(c) Symmetric and reflexive but not transitive (d) Equivalence
8. If $f(x) = \frac{1}{x}$ and $g(x) = 0$ the fog(x) is
(a) x (b) $\frac{1}{x}$ (c) 0 (d) not defined

9. If $f(x) = \frac{4x+3}{6x-4}$, $x \neq \frac{2}{3}$, then $f \circ f(x) =$
- (a) x (b) $\frac{1}{x}$ (c) 0 (d) not defined
10. If $f: \mathbb{R} \rightarrow \mathbb{R}$ defined as then $f(x) = (x-1)(x-2)(x-3)$ is
- (a) one-one but not onto (b) onto but not one-one
- (c) both one-one onto (d) neither one-one nor onto
11. If $f(x) = x^2 + 1$ and $g(x) = 1 - \frac{1}{1-x}$ then find the function $\{g \circ f\}(x)$
12. f is a real valued function defined as $f(x) = \frac{3x}{3x+4}$, find the inverse of f .
13. Show that the inverse of a function is unique, if exists.
14. Show that $f(x) = \sin x$ and $g(x) = \cos x$ from $[0, \frac{\pi}{2}] \rightarrow \mathcal{R}$ are one one but $f+g$ is not one one .
15. if $f: \mathcal{R} \rightarrow \mathcal{R}$, defined as $f(x) = x^3 - 3x + 2$, find $f(f(x))$.
16. R is a relation on set of all Integers \mathbb{Z} such that $(x, y) \in R$ if $(x - y)$ is a multiple of 6, Explain why R is equivalence.
17. Relation $\#$ is defined on the set of all triangles in a plane as $\mathbf{R} = \{(a, b) : a \text{ is similar to } b\}$ then check the reflexivity, symmetry and transitivity of $\#$.
18. Find the domain of function, $f(x) = \frac{2x+1}{(x-1)[3-\sin 2x]}$
19. Show that $f: [-1, 1] \rightarrow \mathcal{R}$ given by $f(x) = \frac{x}{x+2}$ is always one-one, find f^{-1} from $[-1, 1]$ to range f
20. Show that a function $f: \mathbb{R} \rightarrow \mathbb{R}$, defined as $f(x) = x - [x]$ is neither one-one nor onto
