

Model Question paper
Functions and Graphs 1

11th Standard

Maths

Reg.No. :

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I. Answer all the questions.

II. Use blue pen only.

Time : 00:50:00 Hrs

Total Marks : 35

5 x 1 = 5

Part - A

- 1) Identify the correct statement.
(a) The set of real numbers is a closed set (b) The set of all non-negative real numbers is represented by $(0, \infty)$
(c) The set $[3, 7]$ indicates the set of all natural numbers between 3 and 7 (d) $(2, 3)$ is a subset of $[2, 3]$
- 2) Identify the correct statements of the following:
(i) A relation is a function
(ii) A function is a relation
(iii) "A function which is not a relation" is not possible
(iv) 'A relation which is not a function' is possible
(a) (ii), (iii) and (iv) (b) (ii) and (iii) (c) (iii) and (iv) (d) All
- 3) The inverse of $f: \mathbb{R} \rightarrow \mathbb{R}^+$; $f(x) = x^2$ is _____.
(a) not onto (b) not one-to-one (c) not onto and not one-to-one (d) not at all a function
- 4) If $A \times B = \{(1, 2), (1, 3), (1, 6), (7, 2), (7, 3), (7, 6)\}$, then the set A is
(a) $\{2, 3, 6\}$ (b) $\{1, 7\}$ (c) $\{1, 2, 3, 6, 7\}$ (d) Φ
- 5) $A = \{1, 2, 3\}$, $B = \{4, 5, 6\}$; $f: A \rightarrow B$ is defined as $f(1) = 4$, $f(2) = 5$, $f(3) = 6$ then f^{-1} is
(a) $\{(4, 1), (5, 2), (6, 3)\}$ (b) $\{(1, 4), (2, 5), (3, 6)\}$ (c) $\{(1, 1), (2, 2), (3, 3)\}$ (d) $\{(4, 4), (5, 5), (6, 6)\}$

Part - B

5 x 2 = 10

- 6) If $f, g: \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = x + 1$ and $g(x) = x^2$ find $(f \circ g)(3)$
- 7) Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be defined by $f(x) = 3x + 2$. Find f^{-1} and show that for $f \circ f^{-1} = f^{-1} \circ f = I$
- 8) Solve the following inequation:
 $2x^2 - 3x + 5 < 0$
- 9) If x is real, prove that the range of $f(x) = \frac{x^2 - 2x + 4}{x^2 + 2x + 4}$ is between $[\frac{1}{3}, 3]$
- 10) For the functions f, g , as defined in (1), define
(i) $(f + g)(x)$ (ii) $\left(\frac{f}{g}\right)(x)$ (iii) $(fg)(x)$ (iv) $(f - g)(x)$ (v) $(gf)(x)$

Part - C

4 x 5 = 20

- 11) Let $A = \{1, 2, 3\}$, $B = \{3, 5, 7, 8\}$ and f from A to B is defined by $f: x \rightarrow 2x + 1$ i.e. $f(x) = 2x + 1$.
(a) Find $f(1)$, $f(2)$, $f(3)$
(b) Show that f is a function from A to B
(c) Identify domain, co-domain, images of each element in A and range of f
(d) Verify that whether the range is equal to codomain
- 12) A father 'd' has three sons a, b, c. By assuming sons as a set A and father as a singleton set B, show that
(i) the relation 'is a son of' is a function from $A \rightarrow B$ and
(ii) the relation 'is a father of' from $B \rightarrow A$ is not a function
- 13) Name the function and independent variable of the following function:
(i) $f(\theta) = \sin \theta$
(ii) $f(x) = \sqrt{x}$
(iii) $f(y) = e^y$
(iv) $f(t) = \log_e t$
- 14) Let $f, g: \mathbb{R} \rightarrow \mathbb{R}$ be defined by $f(x) = 2x + 1$, and $g(x) = x - 1^2$. Show that $(f \circ g) = (g \circ f)$.
