RELATIONS AND FUNCTIONS

COMPOSITE AND INVERTIBLE FUNCTION

EXERCISE

Q.1 If $f : R \to R$ is defined as $f(x) = 2x - 1$ and $g : R \to R$ is defined as $g(x) = x^2 + 2$, then the composition $(g \circ f)(x)$ is given by-

(A) $2x^2 - 1$ (B) $(2x - 1)^2$

(C) $2x^2 + 3$ (D) $4x^2 - 4x + 3$

Q.2 If $f : R \to R$ is defined as, $f(x) = 4x^3 + 3$, then $f^{-1}(x)$ equals-

(A) $\left(\frac{x-3}{4}\right)^{\frac{1}{3}}$ (B) $\left(\frac{x^{\frac{1}{3}}-3}{4}\right)$

(C) $\frac{1}{4}(x - 3)^{1/3}$ (D) None of these

Q.3 If $f(x) = \sqrt{|x-1|}$ and $g(x) = \sin x$ then $(f \circ g)(x)$ equals -

(A) $\sin\left\{\sqrt{|x-1|}\right\}$ (B) $\left|\sin\frac{x}{2} - \cos\frac{x}{2}\right|$

(C) $|\sin x - \cos x|$ (D) None of these

Q.4 If $f : R \to R$ and $f(x) = 2x + 1$ and $g : R \to R$ and $g(x) = x^3$,then $(g \circ f)^{-1}(27)$ equals -

(A) -1 (B) 0 (C) 1 (D) 2

Q.5 The domain of function $f(x) = \sqrt{2^x - 3^x}$ is -

(A) $(-\infty, 0]$ (B) R

(C) $[0, \infty)$ (D) No value of x

Q.6 The domain of the function $f(x) = \sin^{-1}\left(\log_2 \frac{x^2}{2}\right)$ is -

(A) $[-2, 2] - (-1, 1)$ (B) $[-1,2] - \{0\}$

(C) $[-2, -1] \cup [1, 2]$ (D) $[-2,2] - \{0\}$

Q.7 The range of function $f(x) = \frac{x^2}{1+x^2}$ is -

(A) $R - \{1\}$ (B) $R^+ \cup \{0\}$

(C) $[0, 1)$ (D) None of these

Q.8 If $f(x) = \frac{2^x + 2^{-x}}{2}$, then $f(x + y).\ f(x - y)$ is equal to -

(A) $\frac{1}{2}\ [f(x+ y) + f(x - y)]$ (B) $\frac{1}{2}\ [f(2x) + f(2y)]$

(C) $\frac{1}{2}\ [f(x+ y).\ f(x - y)]$ (D) None of these

Q.9 If $g(x) = x^2 + x - 2$ and $\frac{1}{2}\ (g \circ f)(x) = 2x^2 - 5x + 2$, then $f(x)$ is equal to -

(A) $2x - 3$ (B) $2x + 3$

(C) $2x^2 + 3x + 1$ (D) $2x^2 - 3x - 1$

Q.10 If $f(x) = |x|$ and $g(x) = [x]$, then value of $fog\left(-\frac{1}{4}\right) + gof\left(-\frac{1}{4}\right)$ is -

(A) 0 (B) 1 (C) –1 (D) $\frac{1}{4}$

ANSWER KEY

1. (D) $4x^2 - 4x + 3$

2. (A) $\left(\frac{x-3}{4}\right)^{1/3}$

3. (B) $\left|\sin\frac{X}{2} - \cos\frac{X}{2}\right|$

4. (C) 1

5. (A) $(-\infty, 0]$

6. (C) $[-2, -1] \cup [1, 2]$

7. (C) $[0, 1)$

8. (B) $\frac{1}{2}\,[f(2x) + f(2y)]$

9. (A) $2x - 3$

10. (B) 1