ULTIMATE MATHEMATICS

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CHAPTER: RELATION & FUNCTION

(3 Marks each) MARKS = 60 Time: 1:30 hrs

Qn 1 → If $A = \{1,2,4\}$, $B = \{2,4,5\}$, $C = \{2,5\}$ then $(A-B) \times (B-C)$ is

(A) $\{(1,2),(1,5),(2,5)\}$ (B) $\{(1,4)\}$ (C) $\{(4,1)\}$ (D) none of these

Qns 2 → If R is a relation on a finite set A having n elements, then the number of relations on A is

(A) 2^n (B) n^2 (C) n^n (D) 2^{n^2}

Qn. 3 → Let $A = \{1,2,3\}$ and $R = \{(a,b) : |a^2 - b^2| \le 5 \,;\, a, b \in A\}$ then number of elements in Relation R is

(A) 6 (B) 7 (C) 8 (D) 5

Qn 4 → Let $A = \{1,2,3,4,5,6\}$. Let R be a relation on set A defined by $R = \{(a,b) :$ b is exactly divisible by a$\}$ then the number of elements in Relation R is

(A) 13 (B) 12 (C) 10 (D) none of these

Qns 5 → The range of the given ~~ea~~ relation

$$R = \{(a,b) : |a-1| = b \;;\; a \in Z \text{ and } |a| \le 3\}$$

(A) $\{0,1,2,3\}$ (B) $\{1,2,3,4\}$ (C) $\{0,1,2,4\}$ (D) $\{0,1,2,3,4\}$

Qn 6 → The domain for which the functions $f(x) = 2x^2 - 1$ and $g(x) = 1 - 3x$ are equal is

(A) $(-2, \frac{1}{2})$ (B) $\{-2, \frac{1}{2}\}$ (C) $\{-1, 2\}$ (D) $(-1, 2)$

Qn. 7 → Let $f = \{(1,1),(2,3),(0,-1),(-1,-3)\}$ be a function described by the formula $f(x) = \alpha x + \beta$, then α and β are

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(A) $\alpha=2, \beta=-1$ (B) $\alpha=2, \beta=1$ (C) $\alpha=1, \beta=-2$ (D) none of these

Qns 8 → let $A=\{12,13,14,15,16,17,18\}$ and $f: A \to Z$ be a function given by
$f(x)=$ highest prime factor of x, then
Range of f is
(A) $\{3,13,5,2,17\}$ (B) $=\{3,13,7,2,17\}$, (C) $\{3,13,7,5,2,17\}$
(D) none of these

Qn 9 → If $f(x)=\frac{1}{1-x}$, then $f(f(f(x)))$ is

(A) $\frac{1}{x}$ (B) $\frac{1}{1-x}$ (C) $\frac{x-1}{x+1}$ (D) none of these

Qn 10 → Domain & Range of $f(x)=\sqrt{\frac{x-2}{3-x}}$ are
(A) $D=(2,3)$ $R=[0,\infty)$ (B) $D=[2,3)$ $R=(0,\infty)$
(C) $D=[2,3)$ $R=[0,\infty)$ (D) $D=[2,3]$ $R=[0,\infty)$

Qn 11 → Range of $f(x)=\frac{x^2}{1+x^2}$ is
(A) $[0,\infty)$ (B) $(-\infty,0]\cup[1,\infty)$ (C) $[0,1]$ (D) $[0,1)$

Qn 12 → Domain of $f(x)=\sqrt{\frac{x-2}{x+2}}+\sqrt{\frac{1-x}{1+x}}$ is
(A) $(-\infty,-2]\cup[2,\infty)$ (B) $[-1,1]$ (C) ϕ (D) none of these

Qn 13 → Domain of $f(x)=\sqrt{\frac{x+3}{(2-x)(x-5)}}$ is

(A) $(-\infty,-3]\cup(2,5)$ (B) $(-\infty,-3)\cup(2,5]$
(C) $(-\infty,-3]\cup[2,5]$ (D) none of these

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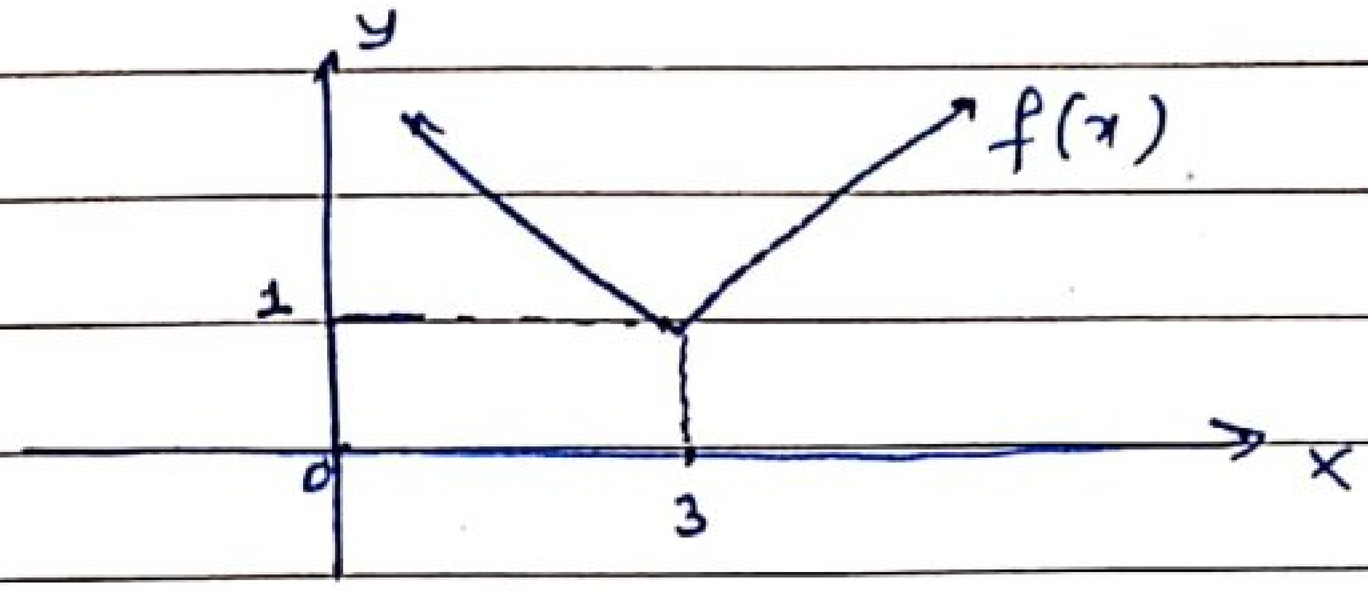
Qn 14 → Identify the function from the given graph



(A) $f(x) = |x+3| + 1$ (B) $f(x) = 1 - |x-3|$ (C) $f(x) = 1 + |x+3|$

(D) $f(x) = 1 + |x-3|$

Qn 15 → let $f = \{(0,1), (2,0), (3,-4), (4,2), (5,1)\}$

$g = \{(1,0), (2,2), (3,-1), (4,4), (5,3)\}$

then $f-g$ is

(A) $\{(2,20), (8,-4), (10,-39)\}$ (B) $\{(2,-1), (8,-5), (10,-16)\}$

(C) $\{(2,9)\ (8,3)\ (10,10)\}$ (D) none of these

Qn 16 → the simplified form of $f(x) = |x-1| + |1+x|$; $-2 \le x \le 2$ is

(A) $f(x) = \begin{cases} 2x & ; -2 \le x < -1 \\ 2 & ; -1 \le x < 1 \\ -2x & ; 1 \le x \le 2 \end{cases}$

(B) $f(x) = \begin{cases} -2x & ; -2 \le x \le -1 \\ 2 & ; -1 < x < 1 \\ 2x & ; 1 < x \le 2 \end{cases}$

(C) $f(x) = \begin{cases} -2x & ; -2 \le x < -1 \\ 2 & ; -1 \le x < 1 \\ 2x & ; 1 \le x \le 2 \end{cases}$

(D) none of these

Qn 17 → Domain of $f(x) = \dfrac{1}{\sqrt{[x]^2 - [x] - 6}}$ is

(A) $(-\infty,-2] \cup [4,\infty)$ (B) $(-\infty,-2) \cup [4,\infty)$

(C) $(-\infty,-2) \cup (4,\infty)$ (D) $(-\infty,-3) \cup [4,\infty)$

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Qn. 18 → Range of $f(x) = \frac{|x-4|}{4-x}$ is

(A) $\{-1\}$ (B) $(-1, 1)$ (C) $\{1\}$ (D) $\{-1, 1\}$

Qn 19 → Range of $f(x) = 1 + 3\cos(2x)$ is

(A) $(-2, 4)$ (B) $[3, 4]$ (C) $[-2, 4)$ (D) None of these

Qn 20 → Domain and Range of Signum function is

(A) Domain = Z Range = R (B) Domain = R Range $\{0, 1\}$

(C) Domain = Z Range $\{-1, 0, 1\}$ (D) Domain = R
Range = $\{1, 0, -1\}$

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