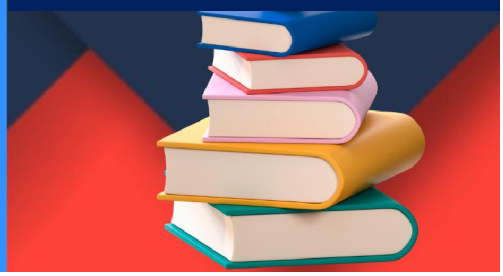
TEST - 02

CLASS XI

CBSE, CUET, JEE MAIN, NDA

MULTIPLE CHOICE Type Questions



By O.P. GUPTA (+919650350480)

Topics : Relations and Functions **Max. Marks : 45**

☑ ***Select the correct option in the followings. Each question carries 1 mark.***

01. Domain of $f(x)=\dfrac{1}{x+1}$ is $x \in$

(a) $\mathbb{R}$ (Real nos.) (b) $\mathbb{R}-1$ (c) $\mathbb{R}-\{-1\}$ (d) $(-\infty,-1)$

02. If $|x|-4\geq 0$, then $x \in$

(a) $(-\infty,-4]\cup[4,\infty)$ (b) $[-4,4]$ (c) $(-\infty,-4)\cup(4,\infty)$ (d) $(-4,4)$

03. If $A=\{0, 1, 2\}$ and, $B=\{\alpha, \beta\}$, then no. of functions defined from A to B is

(a) 64 (b) 9 (c) 8 (d) 6

04. For the function $y=|-x|$, we shall always have $y \in$

(a) Z^+ (b) $(-\infty,0]$ (c) $[0,\infty)$ (d) Z

05. If $A=\{0,2,4\}$, $B=\{1,3\}$ then, a relation R defined from A to B, having maximum number of elements is given by

(a) $B\times B$ (b) $A\times A$ (c) $A\times B$ (d) $B\times A$

06. For the sets $A=\{2,3\}$ and $B=\{1,5,6\}$, the total number of relations from A to B will be

(a) 64 (b) 16 (c) 8 (d) 9

07. Let $A=\{1,2,3\}$, $B=\{4,5,6\}$.
For a relation $R':B\to A$ defined as $R'=\{(x,y): x\in B, y\in A;\ x \text{ is divisible by } y\}$, the roster form is given by

(a) $\{(1,4),(2,4),(1,5),(1,6),(2,6),(3,6)\}$ (b) $\{(4,1),(4,2),(5,1),(6,1),(6,2),(6,3)\}$

(c) $\{(4,1),(4,2),(5,1),(6,1),(6,2)\}$ (d) $\{(4,1),(4,2),(6,1),(6,2),(6,3)\}$

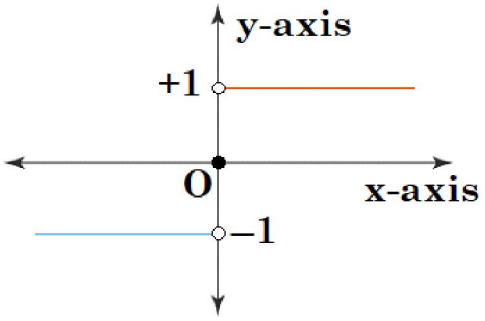
08. For the sets $A=\{2,3\}$, $B=\{4,5,6\}$, the value of $n(A\times B)$ will be

(a) 8 (b) 9 (c) 6 (d) 64

09. Domain of $f(x)=\dfrac{1}{[x]}$ is given by $x \in$

(a) $x\in\mathbb{R}$ (b) $x\in Z$ (c) $x\in\mathbb{R}-Z$ (d) $x\in\mathbb{R}-[0,1)$

10. Consider the graph shown.



Which function is represented by this graph?
(a) Greatest integer function
(b) Modulus function
(c) Signum function
(d) Logarithmic function

11. $f(x)=\sqrt{[x]-x}$ is defined when $x \in$
(a) $\mathbb{R}$ (Real nos.) (b) Z (c) $\mathbb{R}-\mathbb{R}^-$ (d) ϕ

12. For $f(x)=3-|x|$, the range is given by
(a) $(-\infty,3)$ (b) $[0,\infty)$ (c) $\mathbb{R}-\mathbb{R}^-$ (d) $(-\infty,3]$

13. Domain of $f(x)=\sqrt{1+x^2}$ is
(a) $\mathbb{R}$ (Real nos.) (b) $[1,\infty)$ (c) $(-\infty,1]$ (d) $(1,\infty)$

14. Domain of $f(x)=\dfrac{1}{\sqrt{x+|x|}}$ is
(a) $x \in \mathbb{R}$ (b) $x \in \mathbb{R}-\mathbb{R}^+$ (c) $x \in \mathbb{R}-\{0\}$ (d) $x \in \mathbb{R}^+$

15. Let $A=\{1,2,3\}$, $B=\{4,5,6\}$. Let $S: A \to B$, where $S=\{(1,4),(2,5),(3,6),(1,5)\}$. Then, S is
(a) a relation only (b) a function only
(c) a relation and function both (d) neither relation nor function

16. For $R=\{(x,y): y=|x-1|,\ x \in Z \text{ and } |x|<3\}$, the domain of R is
(a) $\{\pm3,\pm2,\pm1\}$ (b) $\{0, 1, 2\}$ (c) $\{\pm2,\pm1,0\}$ (d) $\{\pm3,\pm2,\pm1,0\}$

17. If $y=\sqrt{(9-x)^2}$, then $x \in$
(a) $\mathbb{R}$ (Real nos.) (b) $\mathbb{R}-\{9\}$ (c) $(9,\infty)$ (d) $[9,\infty)$

18. The number of relations defined on the set $A=\{x: x \in N,\ x<1\}$ is
(a) 1 (b) 0 (c) 2 (d) 4

19. If $f(x)=\begin{cases}-1, \text{ if } x<0\\ 0, \text{ if } x=0\\ 1, \text{ if } x>0\end{cases}$, then domain of function $f(x)$ is
(a) $\{-1, 0, 1\}$ (b) $\{-1, 1\}$ (c) $x \in Z$ (integers) (d) $x \in R$ (real nos.)

20. For $f(x)=\sqrt{(x+1)^2}+\sqrt{x^2-9}$, the domain is given by
(a) $x \in \mathbb{R}$ (Real nos.) (b) $x \in (-\infty,3)$ (c) $x \in [3,\infty)$ (d) $x \in (-\infty,-3]\cup[3,\infty)$

21. Domain of $f(x)=\dfrac{1}{\sqrt{x}}$ is
(a) $x \in \mathbb{R}$ (Real nos.) (b) $x \in \mathbb{R}-\{0\}$ (c) $x \in [0,\infty)$ (d) $x \in (0,\infty)$

22. If $A=\{1, 2\}$, $B=\{5,6,7\}$ and $C=\{5,6,7,8\}$, then which of the following is correct?
(a) $n[A\times(B\cup C)]=6$ (b) $n[A\times(B\cup C)]=14$
(c) $n[A\times(B\cap C)]=8$ (d) $n[A\times(B\cup C)]=8$

23. For the function $f(x)=-|5x-3|$, the range is
(a) $[0,\infty)$ (b) $(-\infty,0)$ (c) $(-\infty,0]$ (d) $(0,\infty)$

24. If $A\times B=\{(1,2),(1,4),(3,2),(3,4)\}$, then $B\times A=$
(a) $\{(2,1),(4,1),(2,3),(4,3)\}$ (b) $\{(1,2),(1,4),(3,2),(3,4)\}$
(c) $\{(1,2),(3,2)\}$ (d) $\{(1,2),(1,4),(3,2)\}$

25. If $A\times A=\{(1,1),(1,2),(1,3),(2,1),(2,2),(2,3),(3,1),(3,2),(3,3)\}$, then $A=$
(a) $\{1, 2, 3\}$ (b) $\{1, 2\}$ (c) $\{0, 1, 2, 3\}$ (d) $\{0, 1, 2\}$

26. If $(x-1, 2x-y)=(-1, 3)$, then y^x is
(a) -3 (b) 3 (c) 1 (d) 0

27. If R be a relation from a set A to itself, then

(a) $R = A$ (b) $R = A^2$ (c) $R \subseteq A \times A$ (d) $R \subseteq A \times B$

28. If $2f(x) - 3f\left(\frac{1}{x}\right) = x^2, (x \neq 0)$, then $f(1) =$

(a) 1 (b) -1 (c) 0 (d) 2

29. Let $[.]$ be a greatest integer function. For $-\frac{\pi}{2} < x < \frac{\pi}{2}$, the range of the function $f(x) = [2x]$ is

(a) $\{\pm 3, \pm 2, \pm 1, 0\}$ (b) $\{\pm 3, \pm 2, \pm 1\}$ (c) $\{-4, \pm 3, \pm 2, \pm 1, 0\}$ (d) $\{\pm 4, \pm 3, \pm 2, \pm 1, 0\}$

30. If $f(x) = \frac{x+3}{x-3}$ and $g(x) = \frac{3x + x^3}{1 + 3x^2}$, then $g(1) =$

(a) $f(1)$ (b) $f(0)$ (c) $\{f(0)\}^2$ (d) $\{f(1)\}^2$

31. If $f(x) = \frac{|x|}{4 + |x|}$, then domain of $f(x)$ is

(a) $x \in (0, \infty)$ (b) $x \in (-\infty, 0)$ (c) $x \in [0, \infty)$ (d) $x \in (-\infty, \infty)$

32. Domain of $f(x) = \frac{1}{\sqrt{x - x^2}}$ is

(a) $R - [0, 1]$ (b) $R - (0, 1)$ (c) $(0, 1)$ (d) $[0, 1]$

33. If $[x]^2 - 5[x] - 6 = 0$, where $[.]$ denote the greatest integer function, then $x \in$

(a) $[-1, 0) \cup [6, 7]$ (b) $[-1, 0) \cup [6, 7)$ (c) $[-1, 0] \cup [6, 7)$ (d) $[-1, 6]$

34. If $A = \{4, 5\}$ and $B = \{1, 2, 3\}$, then

(a) $(4, 1) \in A \times B$ (b) $(2, 5) \in A \times B$ (c) $(4, 1) \in B \times A$ (d) $(2, 9) \in B \times A$

35. The number of empty relations defined on an empty set is

(a) 1 (b) 2 (c) 0 (d) 4

36. Let $f(x) = \sqrt{1 + x^2}$, then

(a) $f(xy) = f(x) f(y)$ (b) $f(xy) \geq f(x) f(y)$ (c) $f(xy) \leq f(x) f(y)$ (d) None of these

37. The domain and range of the real function f defined by $f(x) = \frac{4 - x}{x - 4}$ is given by

(a) Domain $= R$, Range $= \{-1, 1\}$ (b) Domain $= R - \{1\}$, Range $= R$
(c) Domain $= R - \{4\}$, Range $= \{-1\}$ (d) Domain $= R - \{-4\}$, Range $= \{-1, 1\}$

38. Range of $y = \frac{3}{2 - x^2}$ is

(a) $x > \frac{3}{2}$ (b) $x \geq \frac{3}{2}$ (c) $y > \frac{3}{2}$ (d) $y \geq \frac{3}{2}$

39. If $f(x) = \frac{x - 1}{x + 1}$, then

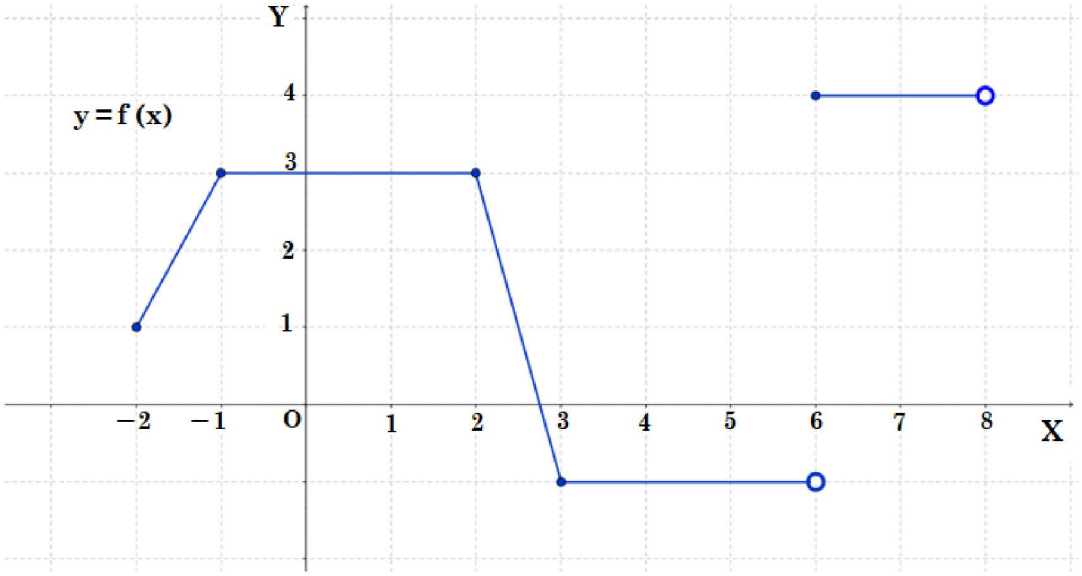
(a) $f\left(\frac{1}{x}\right) = f(x)$ (b) $f\left(\frac{1}{x}\right) = -f(x)$ (c) $f\left(\frac{1}{x}\right) = 2f(x)$ (d) $f\left(\frac{1}{x}\right) = -2f(x)$

40. Let f and g be two real functions defined by $f(x) = \sqrt{x - 1}$ and $g(x) = -2x + 3$.

Then the domain of $\frac{g}{f}$ is

(a) $(1, \infty)$ (b) $[1, \infty)$ (c) $R - \left\{\frac{3}{2}\right\}$ (d) $(-\infty, 1]$

41. Consider the graph of the function $y = f(x)$ given below.



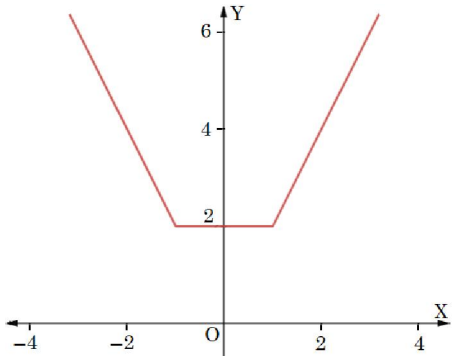
Then the domain and range of the function $y = f(x)$ will be

(a) Domain : $[-1, 3] \cup \{4\}$; Range : $[-2, 8)$ (b) Domain : $[-2, 8)$; Range : $[-1, 3] \cup \{4\}$

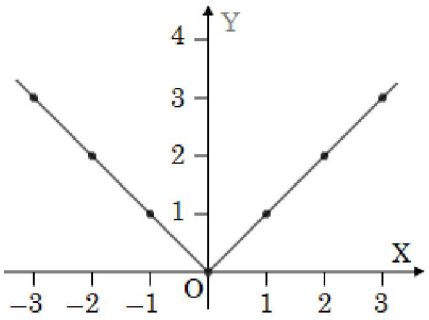
(c) Domain : $[-2, 8)$; Range : $[-1, 4]$ (d) Domain : $[-2, 4)$; Range : $[-1, 3] \cup \{8\}$

42. Let $f : R \to [0, \infty)$ be a function defined by $f(x) = |x|$ and $g(x) = f(x+1) + f(x-1)\ \forall\ x \in R$. Then the graph of $g(x)$ is

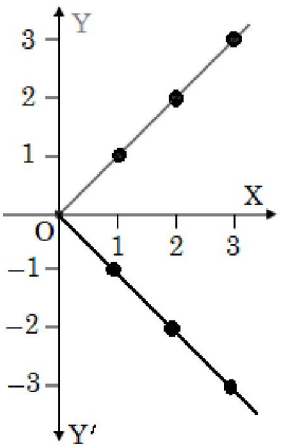
(a)



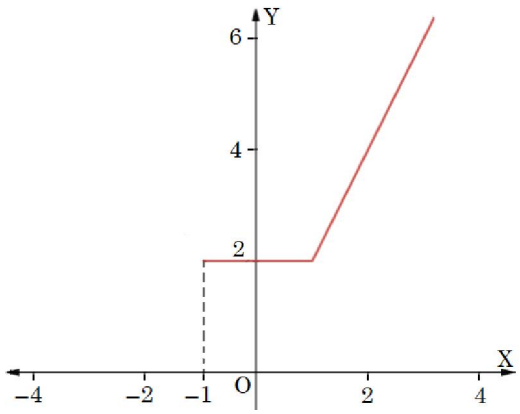
(b)



(c)



(d)



*Question numbers **43** to **45** are Assertion and Reason based questions. Two statements are given, one labelled **Assertion (A)** and the other labelled **Reason (R)**. Select the correct answer from the codes (a), (b), (c) and (d) as given below.*

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true and Reason (R) is **not** the correct explanation of Assertion (A).

(c) Assertion (A) is true but Reason (R) is false.

(d) Assertion (A) is false but Reason (R) is true.

43. **Assertion (A) :** If the functions defined by $f(x) = 3x^2 - 1$ and $g(x) = 3 + x$ are equal, then the set of values of x will be $\left\{\frac{4}{3}, -1\right\}$.

Reason (R) : The range of greatest integer function $f(x) = [x]$ is $\mathbb{R}$ (set of real numbers).

44. **Assertion (A) :** The ordered pair (5, 2) belongs to the relation $R = \{(x, y) : y = x - 5;\ x, y \in Z\}$.

Reason (R) : If $A \times B = \{(a, x), (a, y), (b, x), (b, y)\}$, then $A = \{a, b\}$ and $B = \{x, y\}$.

45. **Assertion (A) :** Given that $(x - 2,\ y + 5)$ and $\left(-2, \frac{1}{3}\right)$ are two equal ordered pairs, then $2024x + 3y + 14 = 0$.

Reason (R) : If f and g are real functions defined by $f(x) = x^2 + 7$ and $g(x) = 3x + 5$, then $(f \,.\, g)(x) = 3x^3 + 5x^2 + 21x + 35$.

This document contains MCQs for Mathematics (041) of class XI.
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With a lot of Blessings!

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