MATHS

BOOKS - TARGET MATHS (HINGLISH)

SETS, RELATIONS AND FUNCTIONS

Classical Thinking

1. If B is the set whose elements are obtained by adding 1 to each of the even numbers , then the set builder notation of B is

A. $B = \{x : x \text{ is even }\}$

B. $B = \{x : x \text{ id ood and } x > 1\}$

C. $B = \{x : x \text{ id odd and } x \in Z\}$

D. $B = \{x : x \text{is an integer }\}$

Answer: C

Watch Video Solution

2. Which of the following is a true statement ?

A. $0 \in \{\}$

B. $0 \in \{\{0\}\}$

C. $0 \in \{0\}$

D. $0 \subset \{0\}$

Answer: C

Watch Video Solution

3. The set of the prime numbers is

A. a finite set

B. a singleton set

C. an infinite set

D. a null set

Answer: C

Watch Video Solution

4. $A - B = \phi$ iff

A. $A \subset B$

B. $B \subset A$

C. $A = B$

D. $A \cap B = \phi$

Answer: A

Watch Video Solution

5. If $A \subseteq B$ and $B \subseteq C$, then

A. $B \subseteq A$

B. $C \subseteq A$

C. $C \subseteq B$

D. $A \subseteq C$

Answer: D

Watch Video Solution

6. $A \cup B = A$ if

A. $A \subset B$

B. $B \subset A$

C. $A = B$

D. $A \cap B = \phi$

Answer: B

Watch Video Solution

7. $A \cap B = A$ if

A. $A \subseteq B$

B. $B \cup A$

C. $A = B$

D. $A \cap B = \phi$

Answer: A

Watch Video Solution

8. Two sets A and B are disjoint iff

A. $A \cup B = \phi$

B. $A \cap B = 0$

C. $A - B = \phi$

D. $A \cap B = \phi$

Answer: B

Watch Video Solution

9. If Q is the set of rational numbers and P is the set of irrational numbers, then

A. $P \cap Q = \phi$

B. $P \subset Q$

C. $Q \subset P$

D. $P - Q = \phi$

Answer: A

Watch Video Solution

10. $(A \cup B)'$ is equal to

A. $A' \cup B'$

B. $A' \cap B'$

C. $A \cap B$

D. $A \cup B$

Answer: B

Watch Video Solution

11. $A - B$ is equal to

A. $(A \cup B) - (A \cap B)$

B. $A \cap B'$

C. $A \cap B$

D. $B - A$

Answer: B

Watch Video Solution

12. $A - (B \cup C)$ is equal to

A. $(A - B) \cup (A - C)$

B. $(A \cup B) - (A \cup C)$

C. $(A - B) - (A - C)$

D. $(A - B) \cap (A - C)$

Answer: D

Watch Video Solution

13. If A, B, C are any three sets, then $A \cup (A \cap C)$ is equal to

A. $(A \cap B) \cap (A \cup C)$

B. $(A \cup B) \cup (A \cup C)$

C. $(A \cap B) \cap (A \cap C)$

D. none of these

Answer: A

View Text Solution

14. Let $X = \{x \in N, 1 \leq x \leq 8\}, A = \{1, 2, 3\}, B = \{2, 4, 6\}, C = \{1, 3, 5, 7\},$ then $A' =$

A. $\{1, 3, 5, 7, 8\}$

B. $\{4, 5, 6, 7, 8\}$

C. $\{2, 4, 6, 8\}$

D. $\{4, 5, 7, 8\}$

Answer: B

Watch Video Solution

15. If $A = \{x \mid x$ is natural number$\}$,

$B = \{x \mid$ is an even number$\}$, $A \cap B =$

A. $\{2, 4, 6, 8\}$

B. $\{1, 3, 5, 7\}$

C. $\{2, 4, 6, 8. \ldots\}$

D. $\{1, 3, 5, 7. \ldots\}$

Answer: C

Watch Video Solution

16. If $B = \{x \mid x$ is an even number$\}$,

$C = \{x \mid$ x is an odd numbers$\}$, then $B \cap C =$

A. ϕ

B. $\{2, 4, 6, 8. \ldots\}$

C. $\{1, 3, 5, 7. \ldots\}$

D. $\{0\}$

Answer: A

Watch Video Solution

17. If $A \equiv \{2x / x \in N\} B \equiv \{4x / x \in N\}$, then $A \cup B =$

A. $\{2, 4, 6, 8, 10, 12, 14, 16, 18, 20. \ldots\}$

B. $\{4, 8, 12, 16, 20. \ldots\}$

C. $\{2, 4, 6, 8, 10, 12, 14, 16, 18, 20\}$

D. $\{4, 8, 12, 16, 20\}$

Answer: A

View Text Solution

18. If $A = \{1, 2, 3\}, B = \{3, 4, 5\}, C = \{4, 5, 6\},$ then $A \cup B \cup C =$

A. $\{1, 2, 3, 4, 5, 6\}$

B. $\{3\}$

C. $\{1, 2, 3, 4, 5\}$

D. $\{1, 3, 5\}$

Answer: A

Watch Video Solution

19. Let $X = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

$A = \{2, 4, 5, 7, 8\}, B = \{1, 3, 5, 7\},$

$C = \{4, 6, 8, 9\},$ then $A \cap (B \cup C)$

A. $A \cap (B \cap C)$

B. $A \cup (B \cap C)$

C. $(A \cap B) \cup (A \cap C)$

D. $(A \cup B) \cup (A \cap C)$

Answer: C

Watch Video Solution

20. Let $X = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

$A = \{2, 4, 5, 7, 8\}, B = \{1, 3, 5, 7\},$

$C = \{4, 6, 8, 9\},$ then $A \cap (B \cup C)$

A. $A \cap (B \cap C)$

B. $A \cup (B \cap C)$

C. $(A \cap B) \cup (A \cap C)$

D. $(A \cup B) \cup (A \cup C)$

Answer: A

Watch Video Solution

21. If $A = \{x|$ x is a multiple of $2, x \in N\}$

$B = \{x|$ x is a multiple of $5, x \in N\}$,

$C = \{x|$ x is multiple of $10, x \in N\}$, then

$(A \cap B) \cap C =$

A. $\{5, 15, 25\ldots\}$

B. $\{10, 15, 20\ldots\}$

C. $\{5, 10, 15, 20..\}$

D. $\{10, 20, 30\ldots\}$

Answer: D

Watch Video Solution

22. Let $X = \{a, b, c, p, q, r, x, y, z\}$,

$A = \{b, q, y\}, B = \{a, p, r, x, y\}$ then $(A \cap B)'$

A. $\{a, b, c, p, q, r, x, z\}$

B. $\{a, c, p, r, x, z\}$

C. $\{b, c, q, z\}$

D. $\{a, b, p, q, x, z\}$

Answer: A

Watch Video Solution

23. If A and B are disjoint, then $n(A \cup B)$ is equal to

A. $n(A)$

B. $n(B)$

C. $n(A) + n(B)$

D. $n(A).\ N(B)$

Answer: C

Watch Video Solution

24. If n $(A) = 10, n(B) = 6$ and $n(C) = 5$ for three disjoint sets A,B,C, then $n(A \cup B \cup C)$ equals

A. 11

B. 21

C. 1

D. 9

Answer: B

View Text Solution

25. Sets A and B are such that A has 25 members, B has 20 members and $A \cup B$ and has 35 members. The number of members in the set $A \cap B$ is

A. 10

B. 5

C. 15

D. 20

Answer: A

Watch Video Solution

26. In a class of 100 students, 60 play cricket, 50 play valleyball and 29 play both. Find the number of students who play atleast one of the two games.

A. 18

B. 32

C. 110

D. 82

Answer: D

View Text Solution

27. Out of 20 members in a family, 11 like to take tea and 14 like coeffee. Assume that each one likes at least one of the two drinks. How many like only tea and not coffe ?

A. 9

B. 5

C. 11

D. 6

Answer: D

Watch Video Solution

28. If $A = \{1, 2\}$ and $B = \{0, 1\}$, then $A \times B =$

A. $\{(1, 0), , (1, 1), (2, 0), (2, 1)\}$

B. $\{(1, 0), (2, 1)\}$

C. $\{(1, 1), (1, 2), (0, 1), (0, 2)\}$

D. $\{(1, 0), (2, 0), (0, 0)\}$

Answer: A

Watch Video Solution

29. If A and B are finite sets (non-empty), then number of elements in $A \times B$ is

A. $n(A \cup B)$

B. $n(A \cap B)$

C. $n(A) \times n(B)$

D. none of these

Answer: C

Watch Video Solution

30. If n(A) = 3, n(B) = 4 then $n(A \times A \times B) =$

A. 12

B. 9

C. 16

D. 36

Answer: D

Watch Video Solution

31. If A,B,C be any three sets then $A \times (B \cap C)$ is equal to-

A. $(A \times B) \cup (A \times C)$

B. $(A \times B) \cap (A \times C)$

C. $A \times B - A \times C$

D. $A \times (B - C)$

Answer: A

Watch Video Solution

32. If $A = \{x : x^2 - 5x + 6 = 0\}$. $B = \{2, 4\}$ and $C = \{4, 5\}$, then $A \times (B \cap C)$ is-

A. $\{(2, 4), (3, 4)\}$

B. $\{(4, 2), (4, 3)\}$

C. $\{(2, 4), (3, 4), (4, 4)\}$

D. $\{(2, 2), (3, 3), (4, 4), (5, 5)\}$

Answer: A

Watch Video Solution

33. If $A = \{1, 2, 3\}$, $B = \{3, 4, 5\}$, then $(A \cap B) \times A$ is

A. $\{(1, 3), (2, 3), (2, 2)\}$

B. $\{(3, 1), (3, 2), (3, 3)\}$

C. $\{(1, 3), (3, 1), (3, 2)\}$

D. $\{(1, 3), (2, 4), (3, 5)\}$

Answer: B

View Text Solution

34. If A, B and C are any three sets, then $A \times (B - C)$ is equal to

A. $(A \times B) \cup (A \times C)$

B. $(A \times B) \cap (A \times C)$

C. $(A \times B) - (A \times C)$

D. $(A \times B) - (A \times C)$

Answer: C

View Text Solution

35. If $A = \{1, 2, 4\}, B = \{2, 4, 5\}, C = \{2, 5\},$ then $(A - B) \times (B - C) =$

A. $\{(1, 2), (1, 5), (2, 5)\}$

B. $\{(1, 4)\}$

C. $(1, 4)$

D. $\{(1, 2), (1, 4)\}$

Answer: B

Watch Video Solution

36. Let A and B be two sets such that $n(A) = 5 \, and \, n(B) = 2,$ if a, b, c, d, e are distinct and $(a, 2), (b, 3), (c, 2), (d, 3), (e, 2)$ are in $A \times B$, find A and B.

A. $A = \{a, b, c, d, e\}, B = \{2, 3\}$

B. $A = \{a, b, c, d, e\}, B = \{3, 1\}$

C. $A = \{a, b, c, d, e\}, B = \{2, 2\}$

D. $A = \{a, b, c, e, d\}, B = \{3, 3\}$

Answer: A

Watch Video Solution

37. If $A \times B = \{(a, 1)(a, 5), (a, 2), (b, 2), (b, 5), (b, 1)\}$, find $B \times A$.

A. $\{(a, 1), (a, 5), (a, 2), (b, 2), (b, 5), (b, 1)\}$

B. $\{(1, a), (5, a), (2, a), (2, b), (5, b), (1, b)\}$

C. $\{(1, a), (a, 5), (2, a), (2, b), (5, b), (a, b)\}$

D. does not exist

Answer: B

Watch Video Solution

38. If $A = \{a, b\}$ and $B = \{1, 2, 3\}$ then $(A \times B) \cap (B \times A) =$

A. $\{(a, 1), (a, 2), (a, 3), (b, 1), (b, 2), (b, 3)\}$

B. $\{(1, a), (1, b), (1, c), (2, a), (2, b), (2, c)\}$

C. $\{(a, a,), (b, c,), (a, b), (b, a)\}$

D. ϕ

Answer: D

Watch Video Solution

39. Let $Y = (1, 2, 3, 4, 5\}, A = \{1, 2\}, B = \{3, 4, 5\}$ and ϕ be the null st. If $A \times B$ denotes cortesian product of the sets A and B, then $(Y \times A) \cap (Y \times B)$ is equal to-

A. Y

B. A

C. B

D. ϕ

Answer: D

Watch Video Solution

40. The domain of the relation

$R = \{(1, 3), (3, 5), (2, 6)\}$ is

A. $1, 3 \text{ and } 2$

B. $\{1, 3, 2\}$

C. $\{3, 5, 6\}$

D. $3, 5 \text{ and } 6$

Answer: B

Watch Video Solution

41. Let $R = \{(a, a)\}$ be a relation on a set A.Then R is

A. Symmetric

B. Antisymmetric

C. Symmetric and Antisymmetric

D. Neither Symmetric nor Anti-symmetric

Answer: C

Watch Video Solution

42. In the set $A = \{1, 2, 3, 4, 5\}$, a relation R is defined by $R = \{(x, y)\ x, y \in A \text{ and } x < y\}$. Then R is

A. Reflexive

B. Symmetric

C. Transitive

D. An equivalence relation

Answer: C

Watch Video Solution

43. If $R \subset A \times B$ and $S \subset B \times C$ be two relations, then $(SoR)^{-1} =$

A. $S^{-1}oR^{-1}$

B. $R^{-1}oS^{-1}$

C. SoR

D. RoS

Answer: B

Watch Video Solution

44. If a function $f(x)$ is given as $f(x) = x^2 - 3x + 2$ for all $x \in R$, then $f(-1) =$

A. 6

B. 0

C. 2

D. 8

Answer: A

Watch Video Solution

45. If a function $f(x)$ is given as $f(x) = x^2 - 3x + 2$ for all $x \in R$, then $f(a + h) =$

A. $a^2 + (2a + 3)h - 3a + 2 + h^2$

B. $a^2 + (2a + 3)h + 3a + 2 + h^2$

C. $a^2 + (2a - 3)h + 3a + 2 + h^2$

D. $a^2 + (2a + 3)h + 3a + 2 + h^2$

Answer: C

Watch Video Solution

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

A. $\frac{1}{x^2} + x$

B. $\frac{1}{x} + x^2$

C. $\frac{1}{x^2} - x$

D. $\frac{1}{x} - x^2$

Answer: A

Watch Video Solution

47. If $f(x) = x^2 - 6x + 9, 0 \leq x \leq 4,$ then $f(3) =$

A. 4

B. 1

C. 0

D. does not exist

Answer: C

Watch Video Solution

48. If $f(x) = x^2 - 6x + 5, 0 \leq x \leq 4$ then $f(8) =$

A. 5

B. 21

C. 11

D. does not exist

Answer: D

Watch Video Solution

49. If $f(x) = ax + 6$ and $f(1) = 11,$ then $a =$

A. 6

B. 17

C. 11

D. 5

Answer: D

Watch Video Solution

50. If $f(x) = 4x - x^2,$ then $f(a+1) - f(a-1) =$

A. $4(2-a)$

B. $2(4-a)$

C. $4(2+a)$

D. $2(4+a)$

Answer: A

Watch Video Solution

51. A function f is said to be even, if

A. $f(x) = -f(x)$

B. $f(-x) = f(x)$

C. $f(-x) = -f(x)$

D. none of these

Answer: B

Watch Video Solution

52. Which of the following is a polynomial function ?

A. $\frac{x^2-1}{x}, x \neq 0$

B. $x^2 + 3x^2 - 4x + \sqrt{2}x^{-2}$

C. $\frac{3x^2+7x-1}{3}$

D. $2x^2 + \sqrt{x} + 1$

Answer: C

Watch Video Solution

53. The function

$$f: R \to R: f(x) = 1 \quad \text{if} \quad x > 0$$
$$= 0 \quad \text{if} \quad x = 0$$
$$= -1 \quad \text{if} \quad x < 0 is a$$

A. rational function

B. modulus function

C. signum function

D. sinx function

Answer: B

Watch Video Solution

54. Find $[2.75]$, if $[x]$ denotes greatest integer not greater than x ?

A. 2

B. 3

C. 0.75

D. 1.75

Answer: A

Watch Video Solution

55. Inverse of the function $y = 2x - 3$ is

A. $\frac{x+3}{2}$

B. $\frac{x-3}{2}$

C. $\frac{1}{2x-3}$

D. $\frac{1}{x+3}$

Answer: A

Watch Video Solution

56. If $f(x) = x^2, g(x) = 5x - 6,$ then $g[f(x)] =$

A. $26x^2 - 60x + 36$

B. $5x^2 + 6$

C. $25x^2 + 60x - 36$

D. $5x^2 - 6$

Answer: D

Watch Video Solution

57. If $f(x) = 3x - 1, g(x) = x^2 + 1$ then $f[g(x)] =$

A. $3x^2 + 2$

B. $9x^2 - 6x + 2$

C. $3x^2 - 2$

D. $9x^2 + 6x - 2$

Answer: A

Watch Video Solution

58. If $f(x) = x^2 + 1,$ then the value of (fof) (x) is equal to

A. $x^4 + 1$

B. $x^4 + 2x^2 + 2$

C. $x^4 + x^2 + 1$

D. none of these

Answer: B

Watch Video Solution

59. Let $f: R \to R$ and $g: R \to R$ be given by $f(x) = x^2$ and $g(x) = x^3 + 1$, then (fog) (x)

A. $x^6 + 1$

B. $x^6 - 1$

C. $\left(x^3 - 1\right)^2$

D. $\left(x^3 + 1\right)^2$

Answer: D

Watch Video Solution

60. If $f(x) = 1 - \frac{1}{x}$, then $f\left(f\left(\frac{1}{x}\right)\right)$ is

A. $\frac{1}{x}$

B. $\frac{1}{1+x}$

C. $\frac{x}{x-1}$

D. $\frac{1}{x-1}$

Answer: C

Watch Video Solution

61. If $f(x) = \frac{x-1}{x+1}$, then $f\left(\frac{1}{f(x)}\right)$ equals

A. 0

B. 1

C. x

D. $\frac{1}{x}$

Answer: D

Watch Video Solution

62. If $f(x) = \frac{3x+4}{5x-7}, g(x) = \frac{7x+4}{5x-3}$ then $f[g(x)] =$

A. -41

B. x

C. $-x$

D. 41

Answer: B

Watch Video Solution

63. Let $f: R\overrightarrow{R} and g: R\overrightarrow{R}$ be two given functions such that f is injective and g is surjective. Then which of the following is injective? gof (b) fog (c) gog (d) none of these

A. g and f should be injective and surjective

B. g should be injective and surjective

C. f should be injective and surjective

D. None of them may be surjective and injective

Answer: A

Watch Video Solution

64. Domain of function $f(x) = \sin^{-1} 5x$ is

A. $\left(-\frac{1}{5}, \frac{1}{5}\right)$

B. $\left[-\frac{1}{5}, \frac{1}{5}\right]$

C. R

D. $\left(0, \frac{1}{5}\right)$

Answer: B

Watch Video Solution

65. If $f(x) = \frac{1}{\sqrt{5x-7}}$, then dom (f) =

A. $R - \left\{\frac{7}{5}\right\}$

B. $\left[\frac{7}{5}, \infty\right)$

C. $\left[\frac{5}{7}, \infty\right)$

D. $\left(\frac{7}{5}, \infty\right)$

Answer: D

Watch Video Solution

66. Range of the function $f(x) = \frac{x^2 - 3x + 2}{x^2 + x - 6}$ is

A. $\{x : x \in R, x \neq 3\}$

B. $\{x : x \in R, x \neq 2\}$

C. $\{x : x \in R\}$

D. $\{x : x \in R, x \neq 2, x \neq -3\}$

Answer: D

Watch Video Solution

67. Domain of the function $\log|x^2 - 9|$ is

A. R

B. $R - [-3, 3]$

C. $R - \{-3, 3\}$

D. $\{-3, 3\}$

Answer: C

Watch Video Solution

68. Domain of the function $\sqrt{\log\{(5x - x^2)/6\}}$ is

A. $(2, 3)$

B. $[2, 3]$

C. $[1, 2]$

D. $[1, 3]$

Answer: B

View Text Solution

Critical Thinking

1. Which of the following is not true ?

A. $0 \in \{0, \{0\}\}$

B. $\{0\} \in \{0, \{0\}\}$

C. $\{0\} \subset \{0, \{0\}\}$

D. $0 \subset \{0, \{0\}\}$

Answer: D

Watch Video Solution

2. Which of the following is the empty set ?

A. $\{x : x \text{ is a real number and } x^2 - 1 = 0\}$

B. $\{x : x \text{ is a real number and } x^2 + 1 = 0\}$

C. $\{x : x \text{ is a real number and } x^2 - 9 = 0\}$

D. $\{x : x \text{ is a real number and } x^2 = x + 2\}$

Answer: B

View Text Solution

3. Which of the following set is not a null set ?

A. $P = \{x / x \in N, 2x + 1 \text{ is even}\}$

B. $Q = \{x / x \in I, x^2 \text{ is not positive}\}$

C. $R = \{x / x \in N, x \text{ is odd and } x^2 \text{ is even}\}$

D. $S = \{x / x \in R, x^2 + 1 = 0\}$

Answer: B

Watch Video Solution

4. If $A = \{1, 2, 3, 4, 5\}$, then the number of proper subsets of A is

A. 120

B. 30

C. 31

D. 32

Answer: C

Watch Video Solution

5. $A - B$ is equal to

A. $B - A$

B. $A \cup B$

C. $A \cap B$

D. $A - (A \cap B)$

Answer: D

Watch Video Solution

6. $A - B = A$ iff

A. $A \subset B$

B. $A \cup B$

C. $A \cap B$

D. $A - (A \cap B)$

Answer: D

Watch Video Solution

7. $A - B = B - A$ if

A. $A \subset B$

B. $B \subset A$

C. $A = B$

D. $A \cap B = \phi$

Answer: D

Watch Video Solution

8. If A and B are any two sets, then $(A \cup B) - (A \cap B) =$

A. $A - B$

B. $B - A$

C. $(A - B) \cup (B - A)$

D. none of these

Answer: C

View Text Solution

9. Which of the following is not true ?

A. $(A \cap B) \subset A$

B. $A \sum A \cup B$

C. $(A - B) \subset A$

D. $A \sum (A - B)$

Answer: D

View Text Solution

10. If A is any set, then

A. $A \cup A' = \phi$

B. $A \cap A' = X$

C. $A \cap A' = \phi$

D. none of these

Answer: C

View Text Solution

11. Let $X = \{x / x \in N, 1 \leq x \leq 8\}, A = \{1, 2, 3\}, B = \{2, 4, 6\}, C = \{1, 3, 5, 7\}$ then $(A \cup B)' =$

A. $\{5, 7, 8\}$

B. $\{1, 3, 5, 6, 7, 8\}$

C. $\{2, 4, 6, 8\}$

D. $\{1, 3, 5, 7, 8\}$

Answer: A

View Text Solution

12. If $A \equiv \{a, e, I, o, u\}, C \equiv \{p, q, r, \ldots, z\}$ and $X \equiv \{a, b, c. \ldots, z\}$ is the universal set, then $(A \cup C)' =$

A. $A \cap C$

B. $A' \cap C'$

C. $A' \cup C'$

D. $(A \cap C)'$

Answer: B

View Text Solution

13. $A = \{x / x^2 - 7x + 12 = 0\}$,

$B = \{x / x^2 - x - 12 = 0\}$, then $A \cap B =$

A. $\{3\}$

B. $\{4\}$

C. $\{-3, 3, 4\}$

D. $\{3, 4, 5\}$

Answer: B

Watch Video Solution

14. $B = [x / x^2 - x - 12 = 0\}$

$C = \{x / x^2 - 8x + 15 = 0,$ then $B \cup C =$

A. $\{3, 4, 5\}$

B. $\{3, 4\}$

C. $\{-3, 3, 4, 5\}$

D. $\{-3, 4, 5\}$

Answer: C

Watch Video Solution

15. If $C = \{x : x$ is an odd number$\}$,

$D = \{x : x$ is a prime number$\}$, then $C \cap D =$

A. $\{2, 4, 6, 8. \ldots . \}$

B. $\{1, 2, 3, 4, 5. \ldots \}$

C. ϕ

D. $\{3, 5, 7, 11. \ldots \}$

Answer: D

Watch Video Solution

16. If $A = \{x / x$ is a multiple of $2, x \in N\}$,

$B = \{x|$x is a multiple of $5, x \in N\}$,

$C = \{x \mid x$ is multiple of $10, x \in N\}$, then $A \cap (B \cap C) =$

A. $\{10, 20, 30. \ldots . \}$

B. $\{5, 10, 2, \ldots\}$

C. $\{4, 8, 10, 12. \ldots\}$

D. $\{2, 4, 5, 15. \ldots\}$

Answer: A

Watch Video Solution

17. If X is the universal set and A, B are subsets of X such that $n(X) = 99, n(A') = 80, n(B') = 85$ and $n(A \cap B)' = 94,$ then $n(A \cup B) =$

A. 33

B. 14

C. 28

D. 29

Answer: C

Watch Video Solution

18. Which of the following is an empty set ?

A. The set of prime numbers which are even.

B. The solution set of the equation

$$\frac{2(2x+3)}{x+1} - \frac{2}{x+1} + 3 = 0, x \in R.$$

C. $(A \times B) \cap (B \times A)$ where A and B are disjoint.

D. The set of reals which satisfy $x^2 + ix + I - 1 = 0$

Answer: C

Watch Video Solution

19. If A and B are two sets, then $A \cap (A \cup B)'$ is equal to -

A. A

B. B

C. ϕ

D. $A \cap B$

Answer: C

Watch Video Solution

20. If $AandB$ are two sets, then $(A - B) \cup (B - A) \cup (A \cap B)$ is equal to $A \cup B$ (b) $A \cap B$ (c) A (d) B

A. $A \cup B$

B. $A \cap B$

C. A

D. B'

Answer: A

Watch Video Solution

21. Let U be the universal set and $A \cup B \cup C = \cup$ then $\{(A - B) \cup (B - C) \cup (C - A)\}'$ is equal to

A. $A \cup B \cup C$

B. $A \cup (B \cap C)$

C. $A \cap B \cap C$

D. $A \cap (B \cup C)$

Answer: C

Watch Video Solution

22. $A = \{x^2 - 9x + 20 = 0\}$,

$B = \{x^2 + 13x + 42 = 0\}$

$C = \{x^2 - 3x - 70 = 0\}$ and the universal set

$X = \{-7, -6, 4, 5, 10, 12\}$, then $A \cap (B \cap C) =$

A. $\{-7, -6, 4, 5, 10\}$

B. $\{4, 5, 10\}$

C. $\{-7, 4, 5, 10\}$

D. ϕ

Answer: D

Watch Video Solution

23. If $A \equiv \{x / 6x^2 + x - 15 = 0\}$,

$B \equiv \{x / 2x^2 - 5x + 3 = 0\}$ and

$C \equiv \{x / 2x^2 - x - 3 = 0\}$, then $a \cap B \cap C =$

A. $\left\{-\frac{5}{3}, \frac{3}{2}\right\}$

B. $\left\{1, \frac{3}{2}\right\}$

C. $\left\{-1, \frac{3}{2}\right\}$

D. $\left\{\frac{3}{2}\right\}$

Answer: D

Watch Video Solution

24. In a group of 50presons, everyone takes either tea of coffee. If 35 take tea and 25 take coffee, then the number of persons who take tea only (and not coffee) is

A. 10

B. 25

C. 35

D. 30

Answer: B

Watch Video Solution

25. In a group of 100 children, 62 like pizza, 47 like burger and 36 like both. Find the number of students who like pizza but not burger.

A. 26

B. 15

C. 36

D. 30

Answer: A

Watch Video Solution

26. in a consumer -perference survey of an item, fifteen were found to use Brand A, twenty were found to use Brand B, five were found to be in the habit of using both brands A and B. Find the number of consumers using at least one of the two brands of the item.

A. 30

B. 20

C. 15

D. 35

Answer: A

Watch Video Solution

27. In a battle 70% of the combatants lost one eye, 80% an ear, 75% an arm, 85% a leg. x% lost all the four limbs. The minimum value of x is

A. 10

B. 12

C. 15

D. 9

Answer: A

Watch Video Solution

28. In a group of 20 adults, there are 8 males and 9 vegetarians. Find the number of female non vegetarians, if the group contains 5 male

vegetarians ?

A. 4

B. 8

C. 12

D. 10

Answer: B

Watch Video Solution

29. In a class of 120 students, 46 play chess, 30 lay table tennis and 40 play carrom, 14 play chess and table tennis, 10 play table tennis and carrom , 8 play chess and carrom, and 30 students do not play any of these games. How many students play chess, table tennis and carrom ?

A. 8

B. 6

C. 10

D. 4

Answer: B

Watch Video Solution

30. If A= {(x,y) : y = e^x, $x \in R$} and B = { (x,y) : y = e^{-x}, $x \in$ R } then n (A $\cap$ B) is

A. $A \cap B = \phi$

B. $A \cap B \neq \phi$

C. $A \cup B = R^2$

D. None of these

Answer: B

Watch Video Solution

31. A survey shows that 63% of the Americans like cheese where as 76% like apples. If $x\%$ of the Americans like both cheese and apples then

A. $x = 39$

B. $x = 63$

C. $39 \leq x \leq 63$

D. $39 < x < 63$

Answer: C

Watch Video Solution

32. if $X = \{8^n - 7n - 1 : n \in N)$ and $Y = \{49(n-1) : n \in N\}$, then

A. $X \subseteq Y$

B. $Y \subseteq X$

C. $X = Y$

D. None of these

Answer: A

Watch Video Solution

33. If A={a,b},B={c,d},C={d,e} then {(a,c),(a,d),(a,e),(b,c),(b,d),(b,e)}=

A. $A \cap (B \cap C)$

B. $A \cup (B \cap C)$

C. $A \times (B \cup C)$

D. $A \times (B \cap C)$

Answer: C

Watch Video Solution

34. If $(1, 3), (2, 5)$ and $(3, 3)$ are the three elements of $A \times B$ and the total number of elements in $A \times B$ is 6 then the remaining elements of $A \times B$ are

A. $(1, 5), (2, 3), (3, 5)$

B. $(5, 1), (3, 2), (5, 3)$

C. $(1, 5), (2, 3), (5, 3)$

D. $(1, 3), (2, 5), (3, 3)$

Answer: A

Watch Video Solution

35. Let A and B be two sets such that $A \times B = \{(a, 1), (1, 3), (a, 3), (6, 1), (a, 2), (b, 2)$ then

A. $A = \{1, 2, 3\}$ and $B = \{a, b\}$

B. $A = \{a, b, \}$ and $B = \{1, 2, 3\}$

C. $A = \{1, 2, 3\}$ and $B \subset \{a, b\}$

D. $A \subset \{a, b\}$ and $B \subset \{1, 2, 3\}$

Answer: B

Watch Video Solution

36. Let A and B be two sets such that $A \times B$ consists of 6 elements. If three elements of $A \times B$ are: $(1, 4), (2, 6), (3, 6)$. Find $A \times B$ *and* $B \times A$.

A. $A = \{1, 2\}$ and $B = \{3, 4, 6\}$

B. $A = \{4, 6\}$ and $B\{1, 2, 3\}$

C. $A = \{1, 2, 3\}$ and $B = \{4, 6\}$

D. $A = \{1, 2, 4\}$ and $B = \{3, 6\}$

Answer: C

Watch Video Solution

37. Let n(A) = n, then the number of all relations on A, is

A. 2^n

B. $2^{(n)!}$

C. 2^{n^2}

D. n^2

Answer: C

Watch Video Solution

38. Let $A(1, 2, 3)$. The total number of distinct relations that can be defined over A is(

A. 2^9

B. 6

C. 8

D. 9

Answer: A

Watch Video Solution

39. The Cartesian product $A \times A$ has 9 elements among which are found $(1, \quad 0) \quad and \quad (0, \quad 1)$. Find the set A and the remaining elements of $A \times A$.

A. $\{-1, 0, 1\}$

B. $\{-1, 0, 2\}$

C. $\{-1, 11, 10\}$

D. $\{-2, 0, 2\}$

Answer: A

Watch Video Solution

40. If $\mathbb{R}$ is the set of all real numbers. What does the cartesian product $\mathbb{R} \times \mathbb{R} \times \mathbb{R}$ represent?

A. set of all point in space

B. set of all points in XY plane

C. set of points, only Ist Quadrant of XY plane

D. R^2

Answer: A

Watch Video Solution

41. If A = {a, b, c, d} and B = {1, 2, 3}, then which of the following is a relation from A to B?

A. $R_1 = \{(a, 1), (2, b), (c, 3)\}$

B. $R_2 = \{(a, 1), (d, 3), (b, 2), (b, 3)\}$

C. $R_3 = \{(1, a), (2, b), (3, c)\}$

D. $R_4 = \{(a, 1), (b, 2), (c, 3), (3, d)\}$

Answer: B

Watch Video Solution

42. If R is a relation from a finite set A having m elements to a finite set B having n elements then the number of relations from A to B is

A. 2^{mn}

B. $2_{mn} - 1$

C. $2mm$

D. m^n

Answer: A

Watch Video Solution

43. If R ={ (x,y) : x,y $\in z, x^2 + y^2 \leq 4$ } is a relation on ZZ then domain of R is { 0,-1,k,-2,2} find the value of k.

A. $\{0, 1, 2\}$

B. $\{0, -1, -2\}$

C. $\{-2, -1, 0, 1, 2\}$

D. $\{-2, -1, 0, 1\}$

Answer: C

Watch Video Solution

44. Prove that the relation congruence modulo m on the set Z of all integers is an equivalence relation.

A. Reflexive only

B. Transitive only

C. Symmetric only

D. An equivalence relation

Answer: D

Watch Video Solution

45. Which one of the following relations on R is an equivalence relation?

A. $aR_1b \Leftrightarrow |a| = |b|$

B. $aR_2b \Leftrightarrow a \geq b$

C. $aR_3b \Leftrightarrow a$ divides b

D. $aR_4b \Leftrightarrow a < b$

Answer: A

Watch Video Solution

46. Let R be an equivalence relation on a finite set A having n elements. Then the number of ordered pairs in R is

A. Less than n

B. Greater than or equal to n

C. Less than or equal

D. not equal to n

Answer: B

Watch Video Solution

47. Let R be relation on a set A such that R=R^{-1} then R is

A. Reflexive

B. Symmetric

C. Transitive

D. Not symmetric

Answer: B

Watch Video Solution

48. The relation R defined in N as $aRb \Rightarrow b$ is divisible by a is

A. Reflexive but not symmetric

B. Symmetric but nottransitive

C. Symmetric and transitive

D. Symmetric

Answer: A

Watch Video Solution

49. The relation is subset of on the power set $P(A)$ of a set A is

A. Symmetic

B. Anti-symmetric

C. Equivlancy relation

D. None of these

Answer: B

Watch Video Solution

50. Let $P = \{(x, y) \mid x^2 + y^2 = 1, x, y \in R\}$. Then, R, is

A. Reflexive

B. Symmetric

C. Transitive

D. Anti-symmetric

Answer: B

Watch Video Solution

51. R is a relation from {11, 12, 13} to {8, 10, 12} defined by $y = x - 3$. Then, R^{-1} is (a) {(8, 11), (10, 13)} (b) {(11, 8), (13, 10)} (c) {(10, 13), (8, 11), (8, 10)} (d) none of these

A. $\{(8, 11), (10, 13), \}$

B. $\{(11, .18), (13, 10)\}$

C. $\{8, 11\}$

D. $\{10, 13\}$

Answer: A

Watch Video Solution

52. If R be a relation from $A = \{1, 2, 3, 4\}$ to $B = \{1, 3, 5\} i.e., (a, b) \in R \Leftrightarrow a < b,$ then Ro R^{-1} is

A. $\{(1, 3), (1, 5), (2, 3), (2, 5), (3, 5), (4, 5)\}$

B. $\{(3, 1), (5, 1), (3, 2), (5, 2), (5, 3), (5, 4)\}$

C. $\{(3, 3), (3, 5), (5, 3), (5, 5)\}$

D. $\{(3, 3), (3, 4), (4, 5)\}$

Answer: C

Watch Video Solution

53. If $f(x) = x^2 - 2x + 3$, then the value of x for which $f(x) = f(x + 1)$ is

A. $1/2$

B. $1/3$

C. 1

D. 3

Answer: A

Watch Video Solution

54. If $f(x) = ax^2 + bx + 2$ and $f(1) = 3, f(4) = 42,$ then a and b respectively are

A. $-3, 2$

B. $3, 2$

C. $-2, 3$

D. $3, -2$

Answer: D

Watch Video Solution

55. If $f(x) = x + \frac{1}{x}$, such that $[f(x)]^3 = f(x)^3 + \lambda f\left(\frac{1}{x}\right)$, then $\lambda =$

A. 1

B. 3

C. -3

D. -1

Answer: B

Watch Video Solution

56. If for non-zero x, $a.\ f(x) + b.\ F\left(\frac{1}{x}\right) = \frac{1}{x} - 5$, where $a \neq b$, then $f(2) =$

A. $\frac{2(2b + 3a)}{2(a^2 - b^2)}$

B. $\frac{3(2b - 3a)}{2(a^2 - b^2)}$

C. $\frac{3(3a - 2a)}{a(a^2 - b^2)}$

D. $\frac{6}{a + b}$

Answer: B

Watch Video Solution

57. If $A = \{1, 2, 3\}$ and $B = \{2, 3, 4\}$ then whilch of the following relations is a function from A to B?

A. $\{(1, 2), (1, 3), (2, 3), (3, 3)\}$

B. $\{(0, 3), (2, 4)\}$

C. $\{(1, 3), (2, 3), (3, 3)\}$

D. $\{(1, 2), (2, 3), (3, 4), (3, 2)\}$

Answer: C

Watch Video Solution

58. If in greatest integer function, the domain is a set of real numbers, then range will be set of

A. Real numbers

B. Rational numbers

C. Imaginary numbers

D. Intergers

Answer: D

Watch Video Solution

59. Which of the following is an even function ?

A. $\sin x$

B. $x^2 + \sin^2 x$

C. $\sin^3 x$

D. all of above

Answer: B

Watch Video Solution

60. Which of the following functions is (are) even, odd or neither:

$f(x) = \sqrt{1 + x + x^2} - \sqrt{1 - x + x^2}$

A. $f(x) = \sqrt{1 + x + x^2} - \sqrt{1 - x + x^2}$

B. $f(x) = x\left(\frac{a^2 + 1}{a^x - 1}\right)$

C. $f(x) = \log_{10}\left(\frac{1-x^2}{1+x^2}\right)$

D. $f(x) = k$ (constant)

Answer: A

Watch Video Solution

61. Let f be a real valued function, satisfying $f(x+y) = f(x)f(y)$ for all a,y $\in R$ Such that,$f(1_{-}a. Then, f(x) =$

A. a^x

B. ax

C. x^a

D. $\log x$

Answer: A

Watch Video Solution

62. If $f: R \to R$ is defined as $f(x) = x^2 - 3x + 4$ for all $x \in R$, then $f^{-1}(2)$ is equal to

A. $\{1, 2\}$

B. $(1, 2)$

C. $[1, 2]$

D. none of these

Answer: A

Watch Video Solution

63. If $f(x) = \frac{1}{1-x}$, then $f(f(f(x)))$ is equal to

A. $\frac{x-1}{x}$

B. $f(x)$

C. x

D. $-x$

Answer: C

Watch Video Solution

64. If $f(x) = \frac{x+3}{4x-5}$ and $t = \frac{3+5x}{4x-1}$, then f (t) is

A. $-x$

B. $17x$

C. x

D. $-17x$

Answer: C

Watch Video Solution

65. If $f = \{(1, 4), (2, 5), (3, 5)$ and

$g = \{(4, 8), (5, 7), (6, 9)\}$, then gof is

A. $\{\}$

B. $\{(1, 8), (2, 7), (3, 7)\}$

C. $\{(1, 7), (2, 8), (3, 9)\}$

D. $\{(1, 8), (2, 5), (3, 9)\}$

Answer: B

Watch Video Solution

66. If $f(x) = \dfrac{x-1}{x+1}$ then $f(\alpha x) =$

A. $\dfrac{f(x)+\alpha}{1+\alpha f(x)}$

B. $\dfrac{(\alpha-1)f(x)+\alpha+1}{(\alpha+1)f(x)+(\alpha-1)}$

C. $\dfrac{(\alpha+1)f(x)+\alpha-1}{(\alpha-1)f(x)+(\alpha+1)}$

D. $\dfrac{f(\alpha x)-1}{f(\alpha x)+1}$

Answer: C

Watch Video Solution

67. If f be the greatest integer function and g be the moduls function, then $(gof)\left(-\frac{5}{2}\right)-(fog)\left(-\frac{5}{3}\right)=$

A. 1

B. -1

C. 2

D. 4

Answer: A

Watch Video Solution

68. If $f: R \to$, then $f(x)=|x|$ is

A. One-one but not onto

B. Onto but nt one-one

C. One-one and onto

D. Many-one

Answer: D

Watch Video Solution

69. If $f: [0, \infty) \to [0, \infty)$ and $f(x) = \frac{x}{1+x}$, then f is

A. One-one and onto

B. One-one but not onto

C. Onto but not one-one

D. Neither one-one nor onto

Answer: B

Watch Video Solution

70. Verify whether the function $f: A \to B$, where A = R - {3} and B = R -{1}, defined by $f(x) = \frac{x-2}{x-3}$ is one-one and onto or not. Give reason.

A. one-one into

B. one-one onto

C. many-one into

D. many-one onto

Answer: B

Watch Video Solution

71. If R denotes the set of all real numbers, then the function $f: R \to R$ defined by $f(x) = [x]$ is

A. One-one only

B. Onto only

C. Both one-one and onto

D. Neither one-one nor onto

Answer: D

Watch Video Solution

72. Mapping $f: R \to R$ which is defined as $f(x) = \cos x, x \in R$ will be

A. Neither one-one nor onto

B. One-one

C. Onto

D. `One-one onto

Answer: A

Watch Video Solution

73. If the domain of the function $f(x) = x^2 - 6x + 7$ is $(-\infty, \infty)$, then the range of the function is

A. $(-\infty, \infty)$

B. $[-2, \infty)$

C. $(-2, 3)$

D. $(-\infty, -2)$

Answer: B

Watch Video Solution

74. Domain of the function $f(x) = \left(\frac{x}{1+x}\right)$ is

A. $(-\infty, -1) \cup [0, \infty)$

B. R

C. R-{-1}

D. $(-\infty, -1)$

Answer: C

Watch Video Solution

75. Domain of the function $\frac{\sqrt{1+x}-\sqrt{1-x}}{x}$ is

A. $(-1, 1)$

B. $(-1, 1) - \{0\}$

C. $[-1, 1]$

D. $[-1, 1] - \{0\}$

Answer: D

Watch Video Solution

76. The domain of $\sin^{-1}\left[\log_3\left(\frac{x}{3}\right)\right]$ is

A. $[1, 9]$

B. $(-1, 0)$

C. $[-9, 1]$

D. $[-9, -1]$

Answer: A

Watch Video Solution

77. The domain of the function

$f(x) = \sqrt{x^2 - 5x + 6} + \sqrt{2x + 8 - x^2}$, is

A. $[2, 3]$

B. $[-2, 4]$

C. $[-2, 2] \cup [3, 4]$

D. $[-2, 1] \cup [2, 4]$

Answer: C

Watch Video Solution

78. Domain and range of $f(x) = \frac{|x-3|}{x-3}$ are respectively

A. $R, [-1, 1]$

B. $R - \{3\}, \{1, -1\}$

C. R^+, R

D. None of these

Answer: B

Watch Video Solution

79. Range of the function $f(x) = \frac{1}{3x+2}$ is

A. R

B. $R - \{0\}$

C. $(0, \infty)$

D. $R - \left\{ -\frac{2}{3} \right\}$

Answer: B

Watch Video Solution

80. The range of the function, $f(x) = \frac{1 + x^2}{x^2}$ is

A. $(0, 1)$

B. $[0, 1]$

C. $(1, \infty)$

D. $[1, \infty)$

Answer: C

Watch Video Solution

81. Find the range of the function $f(x) = \frac{x}{1 + x^2}$

A. $\left[0, \frac{1}{2}\right]$

B. $\left[-\frac{1}{2}, \frac{1}{2}\right]$

C. $\left[-\frac{1}{2}, 0\right]$

D. $\left[-\frac{1}{2}, 0\right] \cup \left(0, \frac{1}{2}\right]$

Answer: B

Watch Video Solution

82. Range of the function $f(x) = \frac{x^2 - 3x + 2}{x^2 + x - 6}$ is

A. $R - \left[\frac{1}{5}, 1\right]$

B. R

C. $R - \{1\}$

D. $R - \{-3, 2\}$

Answer: C

Watch Video Solution

83. Range of the function $f(x) = \sqrt{x^2 + x + 1}$ is equal to

A. $[0, \infty]$

B. $\left[\frac{\sqrt{3}}{2}, \infty\right)$

C. $\left(\frac{-\sqrt{3}}{2}, \frac{\sqrt{3}}{2}\right)$

D. $(0, 0)$

Answer: B

Watch Video Solution

Competitve Thinking

1. in rule method the null set is resresented by

A. $\{\}$

B. ϕ

C. $\{x : x = x\}$

D. $\{x : x \neq x\}$

Answer: D

Watch Video Solution

2. Which of the following is a ture statement ?

A. $\{a\} \in \{a, b, c\}$

B. $\{a\} \subseteq \{a, b, c\}$

C. ϕ in {a,b,c}

D. All of these

Answer: D

Watch Video Solution

3. Write the set builder form $A = \{-1, 1\}$

A. $A = \{x : x$ is root of the equatin $x^2 = 1\}$

B. $A = \{x : x$ is real number $\}$

C. $A = \{x : x$ is a root of the equation $x^2 + 1 = 0\}$

D. $A = \{x : x$ is an integer$\}$

Answer: A

Watch Video Solution

4. The set $A = \{x : x \varepsilon R, x^2 = 16$ and $2x = 16\}$ is equal to

A. ϕ

B. $\{14, 3, 4\}$

C. $\{3\}$

D. $\{4\}$

Answer: A

Watch Video Solution

5. The set $A = \{x : |2x + 3| < 7\}$ is equal to the set

A. $D = \{x : 0 < x + 5 < 7\}$

B. $B = \{x : -3 < x < 7\}$

C. $E = \{x : -7 < x < 7\}$

D. $C = \{x : -13 < 2x < 4\}$

Answer: A

Watch Video Solution

6. Let $S = \{x \in R : x \geq 0$

and $2|\sqrt{x} - 3| + \sqrt{x}(\sqrt{x} - 6) + 6 - 0\}$ Then S

A. contains exactly one element.

B. contains exactly two elements.

C. contains exactly four elements.

D. is an empty set.

Answer: B

Watch Video Solution

7. The number of non-empty subsets of the set $\{1, 2, 3, 4\}$ is

A. 15

B. 14

C. 16

D. 17

Answer: A

Watch Video Solution

8. If the set A contains 5 elements, then the number of elements in the power set P(A) is equal to

A. 32

B. 25

C. 16

D. 8

Answer: A

Watch Video Solution

9. If $A = \{x : x$ is a multiple of 4$\}$ and $B = \{x : x$ is multiple of 6$\}$ then $A \subset B$ consists of all multiples of

A. 16

B. 12

C. 8

D. 4

Answer: B

Watch Video Solution

10. The number of elements in the set $\{(a, b) : 2a^2 + 3b^2 = 35.\ a.\ b \in Z\}$,where Z is the set of all integers, is

A. 2

B. 4

C. 8

D. 12

Answer: C

Watch Video Solution

11. If S is a set with 10 elements and $A = \{(x, y) : x, y \in S, x \neq y\}$, then the number of elements in A is

A. 100

B. 90

C. 80

D. 150

Answer: B

Watch Video Solution

12. The total number of subset of the set $\{1, 2, \ldots, 10\}$ which do not contain the element 6 is

A. 512

B. 812

C. 1023

D. 1024

Answer: A

Watch Video Solution

13. Two finite sets have m and n elements. The total number of subsets of the first set is 56 more than the total number of subsets of the second set. The value of m and n is

A. $7, 6$

B. $6, 3$

C. $5, 1$

D. $8, 7$

Answer: B

Watch Video Solution

14. Suppose $A_1, A_2 \ldots . A_{30}$ are thirty sets each having 5 elements and $B_1 B_2 \ldots . B_n$ are n sets each having 3 elements ,Let $\bigcup_{i=1}^{30} A_1 = \bigcup_{j=1}^{n} B_j = s$ and each element of S belongs to exactly 10 of the A_1 and exactly 9 of the value of n.

A. 15

B. 3

C. 45

D. 35

Answer: C

Watch Video Solution

15. For any two sets A and B, $A - (A - B)$ equals

A. B

B. $A - B$

C. $A \cap B$

D. $A^c \cap B^c$

Answer: C

Watch Video Solution

16. Three sets A, B and C are such that $A = B \cap C \text{and} B = C \cap A$

A. $A \cap B$

B. $A \supset B$

C. $A = B$

D. $A \subset B'$

Answer: C

Watch Video Solution

17. Let A, B and C be the sets such that $A \cup B = A \cup C$ and $A \cap B = A \cap C$. show that $B = C$

A. $A = B$

B. $B = C$

C. $A = C$

D. $A = B = C$

Answer: B

Watch Video Solution

18. Let A and B be sets. If $A \cap X = B \cap X = \phi$ and $A \cup X = B \cup X$ for some set X then how that A=B

A. $A - B = A \cap B$

B. $A = B$

C. $B - A = A \cap B$

D. None of these

Answer: B

Watch Video Solution

19. If n (A) =3 ,n(3)=6 and $A \subseteq B$ .Then the number of elements in $A \cup B$ is equal to

A. 3

B. 6

C. 9

D. 18

Answer: B

Watch Video Solution

20. If $n(A) = 8$ and $n(A \cap B) = 2$, then $n[(A \cap B)' \cap A]$ is equal to

A. 2

B. 4

C. 6

D. 8

Answer: C

Watch Video Solution

21. Given $A = \{x \mid x \text{ is a root of } x^2 - 1 = 0\}$, $B = \{x \mid x \text{ is a root of } x^2 - 2x + 1 = 0\}$. Then

A. $A \cap B = A$

B. $A \cup B = \phi$

C. $A \cup B = A$

D. $A \cap B = \phi$

Answer: C

Watch Video Solution

22. If $X = \{4^n - 2n - 1 : n \in N\}$ and

$Y = \{9(n-1) : n \in N\}$, then $X \cap Y =$

A. X

B. Y

C. ϕ

D. $\{0\}$

Answer: C

Watch Video Solution

23. If $N_a = \{an : n \in N\}$, then $N_5 \cap N_7$ equals

A. N_7

B. N

C. N_{35}

D. N_5

Answer: C

Watch Video Solution

24. If A and B are two non-empty sets, then $(B - A) \cap (A \cup B)'$ is equal to

A. A

B. A'

C. B

D. none of these

Answer: D

Watch Video Solution

25. Given n(U) = 20, n(A) = 12, n(B) = 9, $n(A \cap B)$ = 4, where U is the universal set, A and B are subsets of U, then $n((A \cup B)')$ equals

A. 17

B. 9

C. 14

D. 3

Answer: D

Watch Video Solution

26. $n(U) = 700, n(A) = 200, n(B) = 300$ और $n(A \cap B) = 100,$ तब $n(A' \cap B') =$

A. 600

B. 400

C. 300

D. 200

Answer: C

Watch Video Solution

27. Sets A and B have 3 and 6 elaments respectively. What can be theminimum number of elements in $A \cup B$

A. 3

B. 6

C. 9

D. 18

Answer: B

Watch Video Solution

28. If A and B are two sets, then $(A \cup B)' \cup (A' \cap b)$ is equal to

A. A^c

B. B^c

C. A

D. B

Answer: A

Watch Video Solution

29. The set $(A \cup B \cup C) \cap (A \cap B' \cup C')' \cap C'$ is equal to

A. $B \cap C^c$

B. $B^c \cap C^c$

C. $B \cap C$

D. $A \cap B \cap C$

Answer: A

Watch Video Solution

30. Which of the following are corect: 1. $A - B = A - (A \cap B)$ 2. $A = (A \cap B) \cup (A - B)$ 3.$A - (B \cup C) = (A - B) \cup (A - C)$

A. 1 and 3

B. 2 only

C. 2 and 3

D. 1 and 2

Answer: D

Watch Video Solution

31. 25 people for programme A, 50 people for programme B, 10 people for both. So, number of employee employed only A is

A. 15

B. 20

C. 35

D. 40

Answer: A

Watch Video Solution

32. In a class of 60 students , 25 students play cricket and 20 students play tennis and 10 students play both the games. Find the number of students who play neither.

A. 45

B. 0

C. 25

D. 35

Answer: C

Watch Video Solution

33. Let X and Y be the sets of all positive divisors of 400 and 1000 respectively (including 1 and the number), Then , $n(X \cap Y) =$

A. 4

B. 3

C. 8

D. 12

Answer: D

Watch Video Solution

34. In a colleage of 300 students, every student reads 6 newspaper and every newspaper is read by 72 students. The no. of newspaper is

A. At least 30

B. At most 20

C. Exactly 25

D. Exactly 30

Answer: C

Watch Video Solution

35. In a flight 55 people speak Hindi, 20 speak English and 15 speak both English and Hindi. The number of people who speak at least one of the two languages is

A. 40

B. 50

C. 20

D. 60

Answer: D

Watch Video Solution

36. A class has 175 students. The following data shows the number of students obtaining one or more subjects : Mathematics 100, Physics 70, Chemistry 40, Mathematics and Physics 30, Mathematics and Chemistry 28, Physics and Chemistry 23, Mathematics & Physics & Chemistry 18. How many students have offered Mathematics alone ?

A. 24

B. 48

C. 60

D. 100

Answer: C

Watch Video Solution

37. Out of 800 boys in a school, 224 played cricket, 240 played hockey and 336 played basketball. Of the total, 64 played both basketball and hockey; 80 played cricket and basketball and 40 played cricket and hockey; 24 played all the three games. The number of boys who did not play any game is

A. 128

B. 216

C. 240

D. 160

Answer: D

Watch Video Solution

38. In a class of 30 pupils, 12 take Chemistry, 16 take Physics and 18 take History. If all the 30 students take atleast one subject and no one take all three, then the number of pupils taking 2 subjects is

A. 16

B. 6

C. 8

D. 20

Answer: A

Watch Video Solution

39. There is a group of 265 persons who like either singing or dancing or painting. In this group 200 like singing, 110 like dancing and 55 like painting. If 60 persons like both singing and dancing, 30 like both singing and painting and10 like all three activities, then the number of persons who like only dancing and painting is

A. 10

B. 20

C. 30

D. 40

Answer: A

Watch Video Solution

40. In a town of 10,000 families it was found that 40% family buy newspaper A, 20% buy newspaper B and 10% families buy newspaper C, 5% families buy A and B, 3% buy B and C and 4% buy A and C. If 2%families buy all the three newspapers, then find the number of families which buy A only

A. 3100

B. 3300

C. 2900

D. 1400

Answer: B

Watch Video Solution

41. If the sets A and B are defined are defined as $A = \{(x, y) : y = e^x, x \in R\}, B = \{(x, y) : y = x, x \in R\}$then

A. $B \subseteq A$

B. $A \subseteq B$

C. $A \cap BB = \phi$

D. $A \cup B = A$

Answer: C

Watch Video Solution

42. Two sets A and B are as under $A = |(a, b) \in R \times R : |a - 5| < 1 \text{ and } |b - 5| < 1\}B = \left[(a, b) \in R \times R\right.$

(1) $B \subset A$ (2) $A \subset B$ (3) $A \cap B = \phi(anemptyset)(4) \neq itherA$ sub B n or B sub A`

A. $A \subset B$

B. $A \cap B = \phi$ (an empty set)

C. neither $A \subset B$ nor $B \subset A$

D. $B \subset A$

Answer: A

Watch Video Solution

43. $If A = \{x, y) : x^2 + y^2 = 25\}$ and

$B = \{(x, y) : x^2 + 9y^2 = 144\}$, then $A \cap B$ contains

A. One point

B. Three points

C. Two points

D. Four points

Answer: D

Watch Video Solution

44. A set contains 2n+1 elements. The number of subsets of this set containing more than n elements :

A. 2^{n-1}

B. 2^n

C. 2^{n+1}

D. 2^{2n}

Answer: D

Watch Video Solution

45. If $X = \{4^n - 3n - 1 : n \in N\}$ and $Y = \{9(n-1) : n \in N\}$, then

A. X

B. Y

C. N

D. None of these

Answer: B

Watch Video Solution

46. Let $A = \{a, b, c\}$ and $B = \{1, 2, 3, 4\}$. Consider a relation R defined from set A to set B. Then R is a subset of set

A. A

B. B

C. $A \times B$

D. $B \times A$

Answer: C

Watch Video Solution

47. If $A = \{a, b, c\}, B = \{b, c, d\}$ and $C = \{a, d, c\}$, then $(A - B) \times (B \cap C) =$

A. $\{(a, c), (a, d)\}$

B. $\{(a, b), (c, d)\}$

C. $\{(c, a), (a, d)\}$

D. $\{(a, c), (a, d), (b, d)\}$

Answer: A

Watch Video Solution

48. If P, Q and R are the subsets of a set A, then prove that $R \times (P^c \cup Q^c)^c = (R \times P) \cap (R \times Q)$.

A. $(R \times P) \cap (R \times Q)$

B. $(R \times Q) - (R \times P)$

C. $(R \times P) \cup (P \times Q)$

D. (A) and (B)

Answer: A

Watch Video Solution

49. If A is the set of even natural number less than 8 and B is the set of prime numbers less then 7, then the number of relations from A to B is 2^9 (b) 9^2 (c) 3^2 (d) $2^9 - 1$

A. 2^9

B. 9^2

C. 9

D. 2^{9-1}

Answer: A

Watch Video Solution

50. If two sets A and B are having 99 elements in common, the number of elements common to each of the sets $A \times B$ and $B \times A$ are $121\lambda^2$, the value of λ is

A. 2^{90}

B. 99^2

C. 100

D. 18

Answer: B

Watch Video Solution

51. Let A and B be two sets containing four and two elements respectively. Then the number of subsets of the set $A \times B$, each having at least three elements is : (1) 219 (2) 256 (3) 275 (4) 510

A. 219

B. 256

C. 275

D. 510

Answer: A

Watch Video Solution

52. Let $A = \{x, y, z\}$ and $B = \{a, b, c, d\}$. Which one of the following is not a relation from A to B

A. $\{(x, a), (x, c)\}$

B. $\{(y, c), (y, d)\}$

C. $\{(z, a), (z, d)\}$

D. $\{(z, b), (y, b), (a, d)\}$

Answer: D

Watch Video Solution

53. $R \subseteq A \times A$ (where $A \neq 0$) is an equivalence relation if R is

A. Reflexive, symmetric but not transitive

B. Reflexive, niether symmetric nor transitive

C. Reflexive, symmetric and transitive

D. None of these

Answer: C

Watch Video Solution

54. In order that a relation R defined on a non-empty set A is an equivalence relation, it is sufficient, if R

A. Is reflexive

B. is symmetric

C. Is transitive

D. Possesses all the obove three properties

Answer: D

Watch Video Solution

55. The number of reflexive relations of a set with four elements is equal to

A. 2^{16}

B. 2^{12}

C. 2^8

D. 2^4

Answer: D

Watch Video Solution

56. If a relation R on the set N of natural numbers is defined as $(x, y) \Leftrightarrow x^2 - 4xy + 3y^2 = 0, Aax, y\varepsilon N$. Then the relation R is

A. reflexive

B. symmetric

C. transitive

D. An equivalence relation

Answer: A

Watch Video Solution

57. let $A = \{2, 4, 6, 8\}$. A relation R on A is defined by $R = \{(2, 6), (6, 2), (4, 6), (6, 4)\}$. Then R is

A. Anti-symmetric

B. Reflexive

C. Symmetric

D. Transitive

Answer: C

Watch Video Solution

58. The relation R defined in N as $aRb \Rightarrow b$ is divisible by a is

A. Reflexive but not symmetric

B. Symmetric but not transitive

C. Symmetric and transitive

D. None of these

Answer: A

Watch Video Solution

59. Let $R = \{(3, 3), (6, 6), (9, 9), (12, 12), (6, 12), (3, 9(, (3, 12), (3, 6)\}$ be relation on the set $A = \{3, 6, 9, 12\}$. The relation is-

A. An equivalence relation

B. Reflexive and symmetric only

C. Reflexive and transitive only

D. Reflexive only

Answer: C

Watch Video Solution

60. The relation $S = \{(3, 3), (4, 4)\}$ on the set $A = \{2, 3, 4\}$ is "_____".`

A. an equivalance relation

B. reflexive only

C. not reflexive but symmetric and transitive

D. symmetric only

Answer: C

View Text Solution

61. let $S = \{1, 2, 3, \ldots, 24\}$. Define a relation '~' on S as $x \sim y$ is the product of the digits in x is same as that of the digits of y. (Note that is x is a single digit number then the product of the digits in x will be considered to be x.) Then the number of equivalence classes for this equivlence relation is

A. 9

B. 10

C. 20

D. 24

Answer: B

View Text Solution

62. Let $R = \{(1, 3), (4, 2), (2, 4), (2, 3), (3, 1)\}$ be a relation on the set $A = \{1, 2, 3, 4\}$. The relation R is

A. Reflexive

B. Transitive

C. Not symmetric

D. A function

Answer: C

Watch Video Solution

63. Let R_1 be a relation defined by

$R_1 = \{(a, b) \mid a > b, a, b \in R\}$. Then R_1 , is

A. An equivalence relation on R

B. Reflexive, transitive but not symmetric

C. Symmetric, transitive but not reflexive

D. Neither transitive nor reflexive but symmetric

Answer: B

Watch Video Solution

64. Let R be the relation on the set R of all real numbers defined by a Rb Iff $|a-b| \leq 1$. Then R is

A. Reflexive and Symmetric

B. Symmetric only

C. Transitive only

D. Anti-symmetric only

Answer: A

Watch Video Solution

65. Let R be a relation defined on the set of natural numbers N as $R = \{(x,\ y) : x,\ y \in N,\ 2x + y = 41\}$ Find the domain and range of R . Also, verify whether R is (i) reflexive, (ii) symmetric (iii) transitive.

A. ρ is equivalence relation

B. ρ is only reflexive relation

C. ρ is only symmetric relation

D. ρ is not transitive

Answer: D

Watch Video Solution

66. On the set R of real numbers, the relation p is defined by xpy, (x ,y) $\in$ R

A. If $|\times y| < 2$ then ρ is reflexive but neither symmetric nor transitive

B. If $x - y < 2$ then ρ is reflexive and symmetric but not transitive

C. If $|x| \geq y$ then ρ is reflexive and transitive but not symmetric

D. If $x > |y|$ then ρ is transitive but neither reflexive nor symmertric

Answer: D

Watch Video Solution

67. Let r be relation from R (set of real numbers) to R defined by $r = \{(a, b) \mid a, b \in R \text{ and } a - b + \sqrt{3} \text{ isan irrational number}\}$. The relation r is

A. an equivlence relation

B. reflexive only

C. symmetric only

D. transitive only

Answer: B

Watch Video Solution

68. On R, a relation p is defined by xpy if and only if x-y is zero or irrational. Then

A. ρ is equivalence relation

B. ρ is reflexive but neither symmetric nor transitive

C. ρ is reflexive and symmetric but not transitive

D. ρ is symmetric and transitive but not reflexive

Answer: C

Watch Video Solution

69. On the set N of all natural numbers define the rational R by aRb iff the G.C.D. of a and b is 2. Then R is

A. Reflexive but not symmetric

B. symmetric only

C. reflexive and transitive

D. rreflexive, symmetric and transitive

Answer: B

Watch Video Solution

70. Let W denote the words in the english dicitionary define the relation R by $R: \{(x, y) \in W \times W$I the words x and y have at least one letter in common }Then R is

A. reflexive, not symmetric and transitive

B. not reflexive, symmetric and transitive

C. reflexive, symmetric and not transitive

D. reflexive, symmetric and transitive

Answer: C

Watch Video Solution

71. For any two numbers θ and ϕ , we define $\theta R \phi$ if and only if $\sec^2 \theta - \tan^2 \phi = 1$ the relation R is -

A. Reflexive but not transitive

B. Symmetric but not reflexive

C. Both reflexive and symmetric but not transitive

D. At equivalence relation

Answer: D

Watch Video Solution

72. If the function $f: N \to N$ is defined by $f(x) = \sqrt{x}$, then $\frac{f(25)}{f(16) + f(1)}$ is equal to

A. $\frac{5}{6}$

B. $\frac{5}{7}$

C. $\frac{5}{3}$

D. 1

Answer: D

Watch Video Solution

73. If $f: R \to R$ be defined by $f(x) = \begin{cases} 2x : x > 3 \\ x^2 : 1 < x \leq 3 \\ 3x : x \leq 1 \end{cases}$

Then, $f(-1) + f(2) + f(4)$ is

A. 9

B. 14

C. 5

D. 10

Answer: A

Watch Video Solution

74. Let $f: R \to R$ satisfy $f(x)(2) = 4,$ then $f\left(\frac{1}{2}\right) =$

A. 0

B. $\frac{1}{4}$

C. $\frac{1}{2}$

D. 1`

Answer: B

View Text Solution

75. If $f(x) = \cos(\log_e x),$ then $f(x)f(y) - \frac{1}{2}\left[f(xy) + f\left(\frac{x}{y}\right)\right]$ has the value-

A. -1

B. $\frac{1}{2}$

C. -2

D. 0

Answer: D

Watch Video Solution

76. The values of $bandc$ for which the identity of $f(x+1)-f(x)=8x+3$ is satisfied, where $f(x)=bx^2+cx+d, are$ $b=2, c=1$ (b) $b=4, c=-1\, b=-1, c=4$ (d) $b=-1, c=1$

A. $b=2, c=1$

B. $b=4, c=-1$

C. $b=-1, c=4$

D. $b=-1, c=1$

Answer: B

Watch Video Solution

77. Given the function $f(x)=\frac{a^x+a^{-x}}{2}, a>2,$ then $f(x+y)+f(x-y)=$

A. $2f(x).\, F(y)$

B. $f(x).\ F(y)$

C. $\dfrac{f(x)}{f(y)}$

D. $\dfrac{1}{2}f(x)f(y)$

Answer: A

Watch Video Solution

78. If $f(x) = \log\left(\dfrac{1+x}{1-x}\right)$, then $f\left(\dfrac{2x}{1+x^2}\right)$ is equal to

A. $[f(x)]^2$

B. $[f(x)]^3$

C. $2f(x)$

D. $3f(x)$

Answer: C

Watch Video Solution

79. If $e^{f(x)} = \frac{10+x}{10-x}, x \in (-10, 10)$ and $f(x) = kf\left(\frac{200x}{100+x^2}\right)$, then k =

A. 0.5

B. 0.6

C. 0.7

D. 0.8

Answer: A

Watch Video Solution

80. If $f(x) = \cos\left[\pi^2\right]x + \cos\left[-\pi^2\right]x$, where $[x]$ denotes the greatest integer function, then the value of $f\left(\frac{\pi}{2}\right)$ is-

A. $f\left(\frac{\pi}{4}\right) = 2$

B. $f(-\pi) = 2$

C. $f(\pi) = 1$

D. $f\left(\frac{\pi}{2}\right) = -1$

Answer: D

Watch Video Solution

81. Prove that if $f(x)$ is periodic function with period T, then the function $f(ax+b)$ where $a > 0,$ is periodic with period

A. T/b

B. aT

C. bT

D. T/a

Answer: D

Watch Video Solution

82. If the graph of the function y = f(x) is symmetrical about the line x = 2, then

A. $f(x) = -f(-x)$

B. $f(2+x) = f(2-x)$

C. $f(x) = f(-x)$

D. $f(x+2) = f(x-2)$

Answer: B

Watch Video Solution

83. Let $f\{(1,1),(2,4),(0,-2),(-1,-5)\}$ be a linear function from Z into Z. Then, f (x) is

A. $f(x) = 3x - 2$

B. $f(x) = 6x - 8$

C. $f(x) = 2x - 2$

D. $f(x) = 7x + 2$

Answer: A

Watch Video Solution

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

A. Even function

B. $f(x_1)f(x_2) = f(x_1 + x_2)$

C. $f(x_1)(f(x_2) = f(x_1 - x_2)$

D. odd function

Answer: D

Watch Video Solution

85. The real valued function $f(x) = \frac{a^x - 1}{x^n(a^x + 1)}$ is even, then the value of n can be

A. 2

B. 3

C. 4

D. None Of These

Answer: B

Watch Video Solution

86. The function $f(x) = \sec\left[\log\left(x + \sqrt{1 + x^2}\right)\right]$ is

A. Odd

B. Even

C. Neither odd nor even

D. Constant

Answer: B

Watch Video Solution

87. The function $f(x) = \sin\left|\log\left(x + \sqrt{x^2 + 1}\right)\right|$ is-

A. Even function

B. Odd function

C. Neither eve nor odd

D. Periodic function

Answer: B

Watch Video Solution

88. If $f(x)+2f\left(\frac{1}{x}\right)=3x, x\neq 0$ and

$S=\{x\in R: f(x)=f(-x)\}$, then S

A. contains exactly one element.

B. contains exactly two elements.

C. Contains more then two elements

D. Is an empty set

Answer: B

Watch Video Solution

89. If [x] denotes the greatest integer $\leq x$, then $\left[\frac{2}{3}\right]+\left[\frac{2}{3}+\frac{1}{99}\right]+\left[\frac{2}{3}+\frac{2}{99}\right]+\ldots+\left[\frac{2}{3}+\frac{98}{99}\right]$ is equal to

A. 99

B. 98

C. 66

D. 65

Answer: C

Watch Video Solution

90. $f(x) = \cos^2 x + \cos^2\left(\frac{\pi}{3} + x\right) - \cos x \cdot \cos\left(x + \frac{\pi}{3}\right)$ is

A. 0

B. $\frac{3}{4}$

C. 1

D. $\frac{4}{3}$

Answer: B

Watch Video Solution

91. If $y = f(x) = \frac{(x+2)}{(x-1)}, then\ x = f(y)$ (b) $f(1) = 3\ y$ increases with xf or $x < 1\ f$ is a rational function of x

A. $f(y)$

B. $(2f(y)$

C. $\frac{1}{f(y)}$

D. $-f(y)$

Answer: A

Watch Video Solution

92. If $g(y)$ is inverse of function $f: R \to R$ given by $f(x) = x + 3,$ then $g(y) =$

A. $y + 3$

B. $y - 3$

C. $\frac{y}{3}$

D. $3y$

Answer: B

Watch Video Solution

93. If $f: R \to R$ is defined by $f(x) = |x|,$ then

A. $f^{-1}(x) = -x$

B. $f^{-1}(x) = \frac{1}{|x|}$

C. The function $f^{-1}(x)$ does not exist

D. $f^{-1}(x) = \frac{1}{x}$

Answer: C

Watch Video Solution

94. If $f(x) = 3x - 5$, then $f^{-1}(x)$ is given by $\frac{1}{(3x-5)}$ is given by $\frac{(x+5)}{3}$ does not exist because f is not one-one does not exist because f is not onto

A. $\frac{1}{3x-5}$

B. Is given by $\frac{x+5}{3}$

C. Does not exist because f is not one-one

D. Does not exist because f is not onto

Answer: B

Watch Video Solution

95. let $f: R \to R$be defined by $f(x) = 2x + 6$ which is a bijective mapping, then $f^{-1}(x)$ is given by

A. $2x + 6$

B. $6x + 2$

C. $\frac{x}{2} - 3$

D. $x - 3$

Answer: C

Watch Video Solution

96. If $f: R \to R$ be a mapping defined by $f(x) = x^3 + 5$, then f^{-1}(x) is equal to

A. $\frac{1}{x^2 + 5}$

B. $(x + 5)^{\frac{1}{3}}$

C. $(5 - x)^{\frac{1}{3}}$

D. $(x - 5)^{\frac{1}{3}}$

Answer: D

Watch Video Solution

97. If $f(x) = \frac{2x-1}{x+5}, x \neq -5$, then $f^{-1}(x)$ is equal to

A. $\frac{x+5}{2x-1} x \neq \frac{1}{2}$

B. $\frac{5x+1}{2-x} x \neq 2$

C. $\frac{5x-1}{2-x}, x \neq 2$

D. $\frac{x-5}{2x+1}, x \neq \frac{1}{2}$

Answer: B

Watch Video Solution

98. Let $f: R - \left\{\frac{5}{4}\right\} \to R$ be a function defines $f(x) = \frac{5x}{4x+5}$. The inverse of f is the map g: Range $f \to R - \left\{\frac{5}{4}\right\}$ given by

A. $g(y) = \frac{y}{5-4y}$

B. $g(y) = \frac{5y}{5+4y}$

C. $g(y) = \frac{5y}{5-4y}$

D. None of these

Answer: C

Watch Video Solution

99. If the function $f:[1,\infty)\to[1,\infty)$ is defined by $f(x)=2^{x(x-1)}$, then $f^{-1}(x)$ is (A) $\left(\frac{1}{2}\right)^{x(x-1)}$ (B) $\frac{1}{2}\sqrt{1+4\log_2 x}$ (C) $\frac{1}{2}\left(1-\sqrt{1+4\log_2 x}\right)$ (D) not defined

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

B. $\frac{1}{2}\left(1+\sqrt{1+4\log_2 x}\right)$

C. $\frac{1}{2}\left(1-\sqrt{1+4\log_2 x}\right)$

D. Not defined

Answer: B

Watch Video Solution

100. The inverse of the function $f(x)=\frac{e^x-e^{-x}}{e^x+e^{-x}}+2$ is given by

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

B. $\log_e\left(\frac{x-1}{3-x}\right)^{\frac{1}{2}}$

C. $\log_e\left(\frac{x}{2-x}\right)^{\frac{1}{2}}$

D. $\log_e\left(\frac{x-1}{x+1}\right)^{-2}$

Answer: B

Watch Video Solution

101. The inverse of $f(x) = \frac{10^x - 10^{-x}}{10^x + 10^{-x}} =$

A. $\log_{10}(2-x)$

B. $\frac{1}{2}\log_{10}\frac{1+x}{1-x}$

C. $\frac{1}{2}\log_{10}(2x-1)$

D. $\frac{1}{4}\log_{10}\frac{2x}{2-x}$

Answer: B

Watch Video Solution

Watch Video Solution

102. The inverset of the function $y = \frac{16^x - 16^{-x}}{16^x + 16^{-x}}$ is

A. $\log_{16}(2 - x)$

B. $\frac{1}{2}\log_{16}\frac{1 + x}{1 - x}$

C. $\frac{1}{2}\log_{16}(2x - 1)$

D. $\frac{1}{4}\log_{16}\frac{2x}{2 - x}$

Answer: B

Watch Video Solution

103. Let R be the set of real number and the mapping $f: R \to R$ and $g: R \to R$ be defined by $f(x) = 5 - x^2$ and $g(x) = 3x - 4,$ then the value of (fog) (-1) is

A. -44

B. -54

C. -32

D. -64

Answer: A

Watch Video Solution

104. If $f: R \to R$ is defined by $f(x) = \frac{x}{x^2+1}$, find $f(f(2))$

A. $\frac{29}{10}$

B. $\frac{1}{29}$

C. 29

D. $\frac{10}{29}$

Answer: D

Watch Video Solution

105. If $x \neq 1$ and $f(x) = \dfrac{x+1}{x-1}$ is a real function, then $f(f(f(2)))$ is

A. 1

B. 2

C. 3

D. 4

Answer: C

Watch Video Solution

106. The composite mapping fog of the maps $f: R \to R, f(x) = \sin x$ and $g: R \to R, g(x) = x^2$, is

A. $(\sin x)^2$

B. $\sin x^2$

C. x^2

D. $x^2(\sin x)$

Answer: B

Watch Video Solution

107. If $f(x) = \sin x + \cos x, x \in (-\infty, \infty)$ and $g(x) = x^2, x \in (-\infty, \infty)$ then (fog)(x) is equal to

A. 1

B. 0

C. $\sin^2(x) + \cos(x^2)$

D. $\sin(x^2) + \cos(x^2)$

Answer: D

Watch Video Solution

108. If $f(x) = \frac{1-x}{1+x}$, then $f[f(\cos 2\theta)] =$

A. $\tan 2\theta$

B. $\sec 2\theta$

C. $\cos 2\theta$

D. $\cot 2\theta$

Answer: C

Watch Video Solution

109. If $f(x) = \left(25 - x^4\right)^{1/4}$ for $0 < x < \sqrt{5}$ then $f\left(f\left(\frac{1}{2}\right)\right) =$

A. 2^{-4}

B. 2^{-3}

C. 2^{-2}

D. 2^{-1}

Answer: D

Watch Video Solution

110. If $f(x) = \frac{x-1}{x+1}$, then f(2) is equal to

A. $\frac{f(x)+1}{f(x)+3}$

B. $\frac{3f(x)+1}{f(x)+3}$

C. $\frac{f(x)+3}{f(x)+1}$

D. $\frac{f(x)+3}{3f(x)+1}$

Answer: B

Watch Video Solution

111. Let $f(x) = \frac{\alpha x}{x+1}, x \neq -1$. Then, for what value of α is $f[f(x)] = x$?

A. $\sqrt{2}$

B. $-\sqrt{2}$

C. 1

D. -1

Answer: D

Watch Video Solution

112. If f(x)=ax+b and g(x)=cx+d, then f(g(x))=g(f(x)) is equivalent to

A. $f(c) = g(a)$

B. $f(d) = g(b)$

C. $f(a) = g(c)$

D. $f(b) = g(b)$

Answer: B

Watch Video Solution

113. If $f(x) = 8x^3, g(x) = x^{\frac{1}{3}},$ then fog (x) is

A. $8x$

B. 8^3x

C. $(8x)^{\frac{1}{3}}$

D. $8x^2$

Answer: A

Watch Video Solution

114. If $f(x) = 2x + 1$ and $g(x)\frac{x-1}{2}$ for all real x, then $(fog)^{-1}\left(\left(\frac{1}{x}\right)\right.$ is equal to

A. x

B. $\frac{1}{x}$

C. $-x$

D. $-\frac{1}{x}$

Answer: B

Watch Video Solution

115. If $f(x) = \sin^2 x + \sin^2\left(x + \frac{\pi}{3}\right) + \cos x \cos\left(x + \frac{\pi}{3}\right) and g\left(\frac{5}{4}\right) = 1,$ then $(gof)(x)$ is _____

A. $\frac{1}{2}$

B. 0

C. $\sin x$

D. None of these

Answer: D

Watch Video Solution

116. Let $g(x) = 1 + x - [x]$ and $f(x) = \begin{cases} -1, & x < 0 \\ 0, & x = 0 \\ 1, & x > 0 \end{cases}$, then for all x, $f[g(x)]$ is equal to

A. x

B. 1

C. f (x)

D. g (x)

Answer: B

Watch Video Solution

117. Two functions $f: R \to R, g: R \to R$ are defined as follows :

$f(x) = \begin{cases} 0 & (\text{x rational}) \\ 1 & (\text{x irrational}) \end{cases}$, $g(x) = \begin{cases} -1 & (\text{x rational}) \\ 0 & (\text{x irrational}) \end{cases}$ then

$(fog)(\pi) + (gof)(e) =$

A. -1

B. 0

C. 1

D. 2

Answer: A

Watch Video Solution

118. If $f: R \to R$ and $g: R \to R$ is given by f(x) =|x| and g(x)=[x] for each $x \in R$ then $\{x \in R: g(f(x)) \leq f(g(x))\}$

A. $Z \cup (-\infty, 0)$

B. $(-\infty, 0)$

C. Z

D. R

Answer: D

Watch Video Solution

119. Let the function f, g, h are defined from the set of real numbers $\mathbb{R}$ to $\mathbb{R}$ such that

$f(x) = x^2 - 1, g(x) = \sqrt{x^2 + 1}, h(x) = \begin{cases} 0 & \text{if } x < 0 \\ x & \text{if } x \geq 0 \end{cases}$. Then

$ho(fog)(x)$ is defined by

A. $\begin{cases} 0, x = 0 \\ x^2, x > 0 \\ -x^2, x < 0 \end{cases}$

B. $\begin{cases} 0 & x = 0 \\ x^2 & x \neq 0 \end{cases}$

C. $\begin{cases} 0 & x \leq 0 \\ x^2 & x > 0 \end{cases}$

D. None of these

Answer: B

Watch Video Solution

120. If

$f(x) = \sin^2 x + \sin^2\left(x + \frac{\pi}{3}\right) + \cos x \cos\left(x + \frac{\pi}{3}\right) and g\left(\frac{5}{4}\right) = 1,$ then

$(gof)(x)$ is _____

A. a polynomial fo first degree in sin x and cos x

B. a constant function

C. a polynomial of second degree in sin x and cos x

D. None of these

Answer: B

Watch Video Solution

121. Let $f(x) = x^2 and g(x) = \sin x f$ or $all x \in R$. Then the set of all x satisfying $(fogogof)(x) = (gogof)(x), where (fog)(x) = f(g(x)),$ is

$\pm\sqrt{n\pi}, n \in \{0, 1, 2, .\}$ $\pm\sqrt{n\pi}, n \in \{1, 2, .\}$

$\frac{\pi}{2} + 2n\pi, n \in \{, -2, -1, 0, 1, 2\}$ $2n\pi, n \in \{, -2, -1, 0, 1, 2, \}$

A. $\pm\sqrt{n\pi}, nion\{0, 1, 2, \ldots\}$

B. $\pm\sqrt{n\pi}, n \in \{1, 2, \ldots\}$

C. $\frac{\pi}{2} + 2n\pi, n \in \{\ldots, -2-1, 0, 1, 2\ldots\}$

D. $2n\pi, n \in \{\ldots, -1-1, 0, 1, 2\ldots\}$

Answer: A

Watch Video Solution

122. Let $f, g: R\overrightarrow{R}$ be a two function defined as $f(x) = |x| + xandg(x) = |x| - x$ for all $x \in R$. Then, find $fogandgof$.

A. 0

B. 4x

C. $-4x$

D. 2x

Answer: C

Watch Video Solution

123. The period of $f(x) = x - [x],$ if it is periodic is

A. f (x) is not periodic

B. $\frac{1}{2}$

C. 1

D. 2

Answer: C

Watch Video Solution

124. If f: R $\rightarrow$ R be defined by $f(x) = e^x$ and g:R $\rightarrow$ R be defined by g(x) =x^2 the mapping gof : R $\rightarrow$ R be defined by (gof)(x) =g[f(x)] $\forall x \in R$ then

A. gof is bijective but f is not injective

B. gof is injective and g is injective

C. gof is injective but g is not bijective gof is surjective and g is surjective

D. gof is injective and g is injective

Answer: C

Watch Video Solution

125. If $f: R \to R$ be defined by $f(x) = \frac{1}{x}, \forall x \in R.$ Then , f is

A. bijective

B. one-one

C. f is not defined

D. onto

Answer: C

Watch Video Solution

126. If $f: A \to B$ is bijection and $g: B \to A$ is that inverse of f, then fog is equal to

A. I_A

B. I_B

C. f

D. $g(x)$

Answer: B

Watch Video Solution

127. If $A = \{1, 2, 3, 4\}$ and $B = \{1, 2, 3, 4, 5, 6\}$ are two sets and function $f: A \to B$ is defined by $f(x) = x + 2$, $\forall x \in A$, then the function f is

A. Bijective

B. Onto

C. One-one

D. Many-one

Answer: C

Watch Video Solution

128. A is a set having 6 distinct elements. The number of distinct functions from A to A which are not bijection is

A. $6! - 6$

B. $6^6 - 6$

C. $6^6 - 6!$

D. $6!$

Answer: C

Watch Video Solution

129. Number of bijective function from a set of 10 elements to itself is

A. $5!$

B. $10!$

C. $15!$

D. $8!$

Answer: B

Watch Video Solution

130. Set A has 3 elements and set B has 4 elements. The number of injections that can be defined from A to B is

A. 144

B. 12

C. 24

D. 64

Answer: C

Watch Video Solution

131. The set A has 4 elements and thse set B has 5 elements, then the number of injective mapping that can be defined from A to B is

A. 72

B. 120

C. 144

D. 60

Answer: B

Watch Video Solution

132. Which one of the following is a bijective function on the set of real numbers ?

A. $2x - 5$

B. $|x|$

C. x^2

D. $x^2 + 1$

Answer: A

Watch Video Solution

133. Let $f: R \to R$ be defined by $f(x) = x^4,$ then

A. f is one-one and onto

B. f may be one-one and onto

C. f is one-one but not onto

D. f is neither one-one nor onto

Answer: D

Watch Video Solution

134. Let the function $f: R \to R$ be defined by $f(x) = 2x + \sin x$. Then, f is

A. One-to-one and onto

B. One-to-one but not onto

C. Onto but not one-to-one

D. neither one-to-one onto

Answer: A

Watch Video Solution

135. Let $f: N \to N$ be defined by $f(x) = x^2 + x + 1, x \in N$. Then is f is

A. One-one onto

B. Many one

C. One-one but not onto

D. None of these

Answer: C

Watch Video Solution

136. The function $f: R \to R$ is defined by $f(x) = (x-1)(x-2)(x-3)$ is

A. One-one but not onto

B. Onto but not one-one

C. Both one-one and onto

D. Neither one-one nor onto

Answer: B

Watch Video Solution

137. A function f from the set of natural number to integers defined by

$$f(n) = \begin{cases} \frac{n-1}{2} & \text{when n is odd} \\ -\frac{n}{2} & \text{when n is even} \end{cases}$$

A. One-one but not onto

B. Onto but not one-one

C. One-one and onto both

D. Neither one-one nor onto

Answer: C

Watch Video Solution

138. Let $f: N \to N$ be defined as $f(n) = \frac{n+1}{2}$ if n is odd and $f(n) = \frac{n}{2}$ if n is even for all n $\in$ N State whether the function f is bijective. Justify your answer

A. onto but not one-one

B. one-one and onto

C. neither one-one nor onto

D. one-one but not onto

Answer: A

Watch Video Solution

139. Let N be the set of all natural numbers, Z be the set of all integers and $\sigma: N \to Z$ defined by

$$\sigma(n) = \begin{cases} \frac{n}{2} & ,\text{if n is even} \\ -\frac{n-1}{2} & ,\text{if n is odd} \end{cases}$$ then

A. σ is one-one but not onto

B. σ is onto but not one-one

C. σ is one-one and onto

D. σ is neither one-one not onto

Answer: C

Watch Video Solution

140. The function $f: R \to R$ defined by $f(x) = e^x$ is

A. Onto

B. Many-one

C. One-one and into

D. Many one and onto

Answer: C

Watch Video Solution

141. $f(x) = \begin{cases} x, & \text{if x is rational} \\ 0, & \text{if x is irrational} \end{cases}, g(x) = \begin{cases} 0, & \text{if x is rational} \\ x, & \text{if x is irrational} \end{cases}$

Then, $f - g$ is

A. one-one and onto

B. one-one end into

C. many one and onto

D. neither one-one nor onto

Answer: A

Watch Video Solution

142. If $x \neq 1$ and $f(x) = \frac{x+1}{x-1}$ is a real function, then $f(f(f(2)))$ is

A. f is one-one and onto in R

B. f is one-one but not onto in R

C. f is onto in R but not one-one

D. f is netither one-one nor onto in R

Answer: A

Watch Video Solution

143. Let $A = \{-1, 0, 1, 2\}$, $B = \{-4, -2, 0, 2\}$ and $f, g: A \to B$ be functions defined by $f(x) = x^2 - x, x \in A$ and $g(x) = 2\left|x - \left(\frac{1}{2}\right)\right| - 1, x \in A$. Are f and g equal? Justify your answer.

(Hint: One may note that two functio

A. $f = g$

B. $f = 2g$

C. $g = 2f$

D. None of these

Answer: A

Watch Video Solution

144. If $f: R \to S$, defined by $f(x) = \sin x - \sqrt{3}\cos x + 1$, is onto then the interval of S, is

A. $[-1, 3]$

B. $[1, 1]$

C. $[0, 1]$

D. $[0, -1]$

Answer: A

Watch Video Solution

145. The function $f: X \to Y$ defined by $f(x) = \sin x$ is one-one butnot onto if X and Y are respectively equal to

A. R and R

B. $[0, \pi]$ and $[-1, 1]$

C. $\left[0, \frac{\pi}{2}\right]$ and $[-1, 1]$

D. $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$ and $[-1, 1]$

Answer: C

Watch Video Solution

146. If $f(x) = \left(x^2 - \frac{10}{x^2+1}\right)\Big)$, for every real numbers. Then the minimum vlaue of f

A. Does not exist because f is bounded

B. Is not attained even through f is bounded

C. Is equal to $+1$

D. Is equal to -1

Answer: D

View Text Solution

147. Domain of the function $f(x) = \sqrt{2 - 2x - x^2}$ is

A. $-\sqrt{3} \leq x \leq \sqrt{3}$

B. $-1 - \sqrt{3} \leq x \leq -1 + \sqrt{3}$

C. $-2 \leq x \leq 2$

D. $-1 + \sqrt{3} \leq x \leq -2 - \sqrt{3}$

Answer: B

Watch Video Solution

148. The domain of the function $\sqrt{\log\left(x^2-6x+6\right)}$ is

A. $(-\infty, \infty)$

B. $\left(-\infty, 3, \sqrt{3}\right) \cup \left(3+\sqrt{3}, \infty\right)$

C. $(-\infty, 1] \cup [5, \infty)$

D. $[0, \infty)$

Answer: C

Watch Video Solution

149. The domain of $f(x) = \dfrac{9\log(x+3)}{x^2+3x+2}$ is

A. $R-\{-2\}$

B. $(-2, +\infty)$

C. $R-\{-1, -2, -3\}$

D. $(-3, \infty)-\{-1, -2\}$

Answer: D

Watch Video Solution

150. The domain of the function $y = f(x) = \frac{1}{\log_{10}(1-x)} + \sqrt{x+2}$ is

A. $[-2, 1)$, excluding 0

B. $[-3, -2]$, excluding -2.5

C. $[0, 1]$, excluding 0

D. none of these

Answer: A

Watch Video Solution

151. The domain of $f(x) = \log|\log x|$ is

A. $(0, \infty)$

B. $(1, \infty)$

C. $(0, 1), \cup (1, \infty)$

D. $(- \infty, 1)$

Answer: C

Watch Video Solution

152. The domain of definition of $f(x) = \sqrt{\frac{1 - |x|}{2 - |x|}}$ is

A. $(- \infty, \ - 1) \cup (2, \infty)$

B. $[- 1, 1] \cup (2, \infty) \cup (- \infty, \ - 2)$

C. $(- \infty, 1) \cup (2, \infty)$

D. $[- 1, 1] \cup (2, \infty)$

Answer: B

Watch Video Solution

153. The domain of the function $f(x) = \sqrt{\log\left(\frac{1}{|\sin x|}\right)}$ $R - \{-\pi, \pi\}$

(b) $R - \{n\pi \mid n\pi Z\}$ $R - \{2n\pi \mid n \in z\}$ (d) $(-\infty, \infty)$

A. $R - \{2n\pi, n \in I\}$

B. $R - \{n\pi, n \in I\}$

C. $R - (-\pi, \pi)$

D. $(-\infty, \infty)$

Answer: B

Watch Video Solution

154. The domain of the function $f(x) = (\log)_{3+x}(x^2 - 1)$ is

$(-3, -1) \cup (1, \infty)$ $(-3, -1) \cup (1, \infty)$

$(-3, -2) \cup (-2, -1) \cup (1, \infty)$

$(-3, -2) \cup (-2, -1) \cup (1, \infty)$

A. $(-3, -1) \cup (1, \infty)$

B. $[-3, -1) \cup [1, \infty)$

C. $(-3, -2) \cup (-2, -1) \cup (1, \infty)$

D. $[-3, -2) \cup (-2, -1) \cup [1, \infty)$

Answer: C

Watch Video Solution

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

A. $\left[1, \frac{-3}{2}\right]$

B. $\left[\frac{3}{2}, \infty\right]$

C. $(-\infty, 1]$

D. $\left[1, \frac{3}{2}\right]$

Answer: D

Watch Video Solution

156. The domain of the function $f(x) = \frac{\sin^{-1}(x-3)}{\sqrt{x-x^3}}$ is

A. $[1, 2)$

B. $[2, 3)$

C. $[1, 2]$

D. $[2, 3]$

Answer: B

Watch Video Solution

157. Domain of the function f(x)=$\sin^{-1}(1+3x+2x^2)$

A. $(-\infty, \infty)$

B. $(-1, 1)$

C. $\left[\left(-\frac{3}{2}, 0\right]\right.$

D. $\left(-\infty, \frac{-1}{2}\right) \cup (2, \infty)$

Answer: C

Watch Video Solution

158. The domain of the function $f(x) = \sqrt{\cos^{-1}\left(\frac{1-|x|}{2}\right)}$ is

A. $-3, 3)$

B. $[-3, 3]$

C. $(-\infty, -3) \cup (3, \infty)$

D. $(-\infty, -3] \cup [3, \infty)$

Answer: B

Watch Video Solution

159. The domain of the function $\cos^{-1}\{\log_2(x^2 + 5x + 8)\}$ is

A. $[2, 3]$

B. $[-2, 2]$

C. $[3, 1]$

D. $[-3, -2]$

Answer: D

Watch Video Solution

160. The range of the function $f(x) = \sqrt{x - x^2}$ is

A. $(0, 3)$

B. $[0, 3]$

C. $(0, 3]$

D. $[0, 3)$

Answer: B

View Text Solution

161. The range of the functin $f(x) = \frac{x+2}{|x+2|}$ is

A. $\{0, 1\}$

B. $\{-1, 1\}$

C. R

D. $R - \{-2\}$

Answer: B

Watch Video Solution

162. Find the range of $f(x) = \frac{x^2 + 34x - 71}{x^3 + 2x - 7}$

A. $[5, 9]$

B. $(-\infty, 5] \cup [9, \infty)$

C. $(5, 9)$

D. $(-\infty, 5) \cup (9, \infty)$

Answer: B

Watch Video Solution

163. IF $f: R - \{2\} \to R$ is a function defined by $f(x) = \frac{x^2 - 4}{x - 2}$, then its range is

A. R

B. $R - \{2\}$

C. $R - \{4\}$

D. $R - \{-2, 2\}$

Answer: C

Watch Video Solution

164. Let $f: R \to R$ be defined as $f(x) = \frac{9x^2 - x + 4}{x^2 \_ x + 4}$. Then the range of the function f (x) is

A. $\left[\frac{3}{5}, \frac{5}{3}\right]$

B. $\left(\frac{3}{5}, \frac{5}{3}\right)$

C. $\left(-\infty, \frac{3}{5}\right) \cup \left(\frac{5}{3}, \infty\right)$

D. $\left[-\frac{5}{3}, \frac{3}{5}\right]$

Answer: A

Watch Video Solution

165. The range of $f(x) = \cos x - \sin x$ is

A. $(-1, 1)$

B. $[-1, 1)$

C. $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

D. $[-\sqrt{2}, \sqrt{2}]$

Answer: D

Watch Video Solution

166. Equation $\cos 2x + 7 = a(2 - \sin x)$ can have a real solution for

A. all values of a

B. $a \in [2, 6]$

C. $a \in (-\infty, 2)$

D. $a \in (0, \infty)$

Answer: B

Watch Video Solution

167. The range of the function $f(x) = \log_e\left(3x^2 + 4\right)$ is equal to

A. $[\log_e 2, \infty]$

B. $[\log_e 3, \infty]$

C. $[2\log_e 3, \infty)$

D. $[2\log_2 2, \infty)$

Answer: D

Watch Video Solution

168. The range of function $f(x) = \log_e \sqrt{4 - x^2}$ is given by

A. $(0, \infty)$

B. $(-\infty, \infty)$

C. $(-\infty, \log_e 2]$

D. $(\log_e 2, \infty)$

Answer: C

Watch Video Solution

169. If $f: \left[0, \frac{\pi}{2}\right) \to R$ is defined as $f(\theta) = \begin{vmatrix} 1 & \tan\theta & 1 \\ -\tan\theta & 1 & \tan\theta \\ -1 & -\tan\theta & 1 \end{vmatrix}$

Then, the range of f is

A. $(2, \infty)$

B. $(-\infty, -2)$

C. $[2, \infty)$

D. $(-\infty, 2]$

Answer: C

Watch Video Solution

170. The range of the function $f(x) = \tan\sqrt{\frac{\pi^2}{9} - x^2}$, is

A. $[0, 3]$

B. $[0, \sqrt{3}]$

C. $[3, \sqrt{3}]$

D. $[\sqrt{3}, 3]$

Answer: B

Watch Video Solution

Evaluation Test

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

A. $2x + 3$

B. $2x - 3$

C. $2x^2 + 3x + 1$

D. $2x^2 - 3x - 1$

Answer: B

Watch Video Solution

2. If f(x) and g(x) are two functions with g (x) = $x - \frac{1}{x}$ and $fog(x) = x^3 - \frac{1}{x^3} - \frac{1}{x^3}$ then f(x) is

A. $3x^2 + 3$

B. $x^2 - \frac{1}{x^2}$

C. $1 + \frac{1}{x^2}$

D. $3x^2 + \frac{3}{x^4}$

Answer: A

Watch Video Solution

3. If $f: R \to R$ satisfies f(x+y)=f(x)+f(y), for all x, y $\in$ R and f(1)=7, then $\sum_{r=1}^{n} f(r)$ is

A. $\frac{7n(n+1)}{2}$

B. $\frac{7n}{2}$

C. $\frac{7(n+1)}{2}$

D. $7n(n+1)$

Answer: A

Watch Video Solution

4. If $f:[-6,6] \to \mathbb{R}$ is defined by $f(x) = x^2 - 3$ for $x \in \mathbb{R}$ then $(fofof)(-1) + (fofof)(0) + (fofof)(1) =$

A. $f\left(4\sqrt{2}\right)$

B. $f\left(3\sqrt{2}\right)$

C. $\left(f\left(2\sqrt{2}\right)\right.$

D. $f\left(\sqrt{2}\right)$

Answer: A

Watch Video Solution

5. Let $[x]$ denote the greatest integer less than or equal to x. If $x = \left(\sqrt{3}+1\right)^5$, then $[x]$ is equal to

A. 75

B. 50

C. 76

D. 152

Answer: B

Watch Video Solution

6. If f is a real valued function such that $f(x+y) = f(x) + f(y)$ and $f(1) = 5$, then the value of f(100) is

A. 200

B. 300

C. 356

D. 500

Answer: D

Watch Video Solution

7. Let R be the real line. Consider the following subsets of the plane $R \times R$. $S = \{(x, y) : y = x + 1 and 0 < x < 2\}, T = \{(x, y) : x - y$ is an integer $\}$. Which one of the following is true? (1) neither S nor T is an equivalence relation on R (2) both S and T are equivalence relations on R (3) S is an equivalence relation on R but T is not (4) T is an equivalence relation on R but S is not

A. S is an equivlence relation on R but T is not

B. T is an equivalence relation on R but S is not

C. Neither S not T is an equivalence relation on R

D. Both S and T are equivalence relations on R

Answer: B

Watch Video Solution

8. Consider the following relations: R = {(x, y) | x, y are real numbers and x = wy for some rational number w}; $S = \left\{ \left(\frac{m}{n}, \frac{p}{q} \right) \mathrm{m}, \mathrm{n}, \mathrm{pandqa\ r\ ei\ n\ t\ e\ g\ e\ r\ ss\ u\ c\ ht\ h\ a\ tn}, \mathrm{q} \neq 0 \mathrm{andq\ m} \right.$. Then (1) neither R nor S is an equivalence relation (2) S is an equivalence relation but R is not an equivalence relation (3) R and S both are equivalence relations (4) R is an equivalence relation but S is not an equivalence relation

A. S is an equivalence relation but R is not an equivalence

B. R and S both are equivalence relations

C. R is an equivalence relation but S is not an equivalence relation

D. neither R not S is an equivalence relation

Answer: A

Watch Video Solution

9. If $\cos\theta - \sin\theta = \sqrt{2}\sin\theta$ then $\cos\theta + \sin\theta$ is equal to

A. $P \subset Q$ and $Q - P = \phi$

B. $Q \not\subset P$

C. $P \not\subset Q$

D. $P = Q$

Answer: D

Watch Video Solution

10. The domain of the function $f(x) = \sin^{-1}\left(\frac{8(3)^{x-2}}{1-3^{2(x-1)}}\right)$ is

A. $(-\infty, 0]$

B. $[2, \infty)$

C. $(0\infty, 0) \cup [2, \infty)$

D. $(-\infty, -1) \cup [1, \infty)$

Answer: C

Watch Video Solution

11. A ral valued functin $f(x)$ satisfies the functional equation $f(x-y)=f(x)f(y)-f(a-x)f(x+y)$ where 'a' is a given constant and $f(0)=1$, $f(2a-x)$ is equal to :

A. $f(-x)$

B. $f(a)+f(a-x)$

C. $f(x)$

D. $-f(x)$

Answer: D

Watch Video Solution

12. If n(A) denotes the number of elements in set A and if $n(A) = 4, n(B) = 5$ and $n(A \cap B) = 3$ then $n[(A \times B) \cap (B \times A)] =$

A. 8

B. 9

C. 10

D. 11

Answer: B

Watch Video Solution

13. if $A = \left(\theta : 2\cos^2\theta + \sin\theta \leq 2\right)$ and b= {theta :(pi)/(2)le theta le (3pi)/(2)},*then*A cap B ` is equal to

A. $\left\{\theta : \frac{\pi}{2} \leq \theta \leq \frac{3\pi}{2}\right\}$

B. $\left\{\theta : \frac{\pi}{2} \leq \theta \leq \frac{5\pi}{6}\right\}$

C. $\left\{\theta: \frac{\pi}{2} \leq \theta \leq \frac{5\pi}{60} \cup \left\{\theta: \pi \leq \theta \leq \frac{3\pi}{2}\right\}\right.$

D. none of these

Answer: C

Watch Video Solution

14. Find the domain of the function : $f(x) = (\log)_{10}\left\{\frac{(\log)_{10}x}{2\left(30(\log)_{10}x\right)}\right.$

A. $(10-, 10^3)$

B. $(10^2, 10^3)$

C. $[10^2, 10^3]$

D. $[10^2, 10^3]$

Answer: C

Watch Video Solution