MATHS

BOOKS - HIMALAYA MATHS (KANNADA ENGLISH)

SETS,RELATIONS AND FUNCTIONS

Question Bank

1. In rule method the null set, is represented by

A. $\{x \mid x \neq x\}$

B. {x|x=x}

C. ϕ

D. {}

Answer: A

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2. Which of the following is the empty set?

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

B. {x|x is real, and $x^2 + 1 = 0$}

C. {x|x is real, and $x^2 - 9 = 0$}

D. {x|x is real and $x^2 - x - 2 = 0$}

Answer: B

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3. 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. two points

C. three points

D. four points

Answer: D

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4. If A and B are any two sets then $A - (A - B)$ is equal to

A. B-A

B. $A \cap B$

C. ϕ

D. $A \cup B$

Answer: B

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

Answer: C

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6. If A and B are any two sets then $A \cap (A \cup B)'$ =

A. B

B. B'

C. A

D. ϕ

Answer: D

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7. A and B are two sets, then $A - B = \phi$, if and only if

A. $A \subset B$

B. $B \subset A$

C. A=B

D. $A \cap B = \phi$

Answer: A

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8. If A,B and C are non -empty sets , then (A-B) $\cup$ (B-A) equals :

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

B. $A \cap B$

C. $A \cup B$

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

Answer: A

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9. If the sets A has p elements, B has q elements, then number of elements is $A \times B$ is

A. p+q

B. p+q+1

C. pq

D. p^2

Answer: C

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10. If $A = \{x : x \in N, (x^2 - 9)(x^2 - 5) = 0\}$ and $B = \{x : x \in N, x(x-2)(x-3) = 0\}$ where N is the set of all natural numbers, then $B \times A$ is

A. {(2, 3), (3, 3)}

B. {(3, 2), (3, 3)}

C. {(0, 3), (2, 3), (3, 3)}

D. {(3,0), (3, 2), (3, 3)}

Answer: A

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11. If A {2, 4} and B= {3, 4, 5} then $(A \cap B) \times (A \cup B)$ =

A. {(2, 2), (3, 4), (4, 2), (5, 4)}

B. {(2, 3), (4, 3), (4, 5)}

C. {(2, 4), (3, 4), (4, 4), (4, 5)}

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

Answer: D

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12. Let A ={1, 2}, B = {3, 4} and C = {4, 5}. Then $(A - B) \times (B - C)$ is

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

B. {(1, 3), (1, 4)}

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

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

Answer: A

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13. If $A = \{1, 2, 3\}, B = \{3, 8\}$, then $(A \cup B) \times (A \cap B)$ is

A. {(3, 1), (3, 2), (3, 3), (3, 8)}

B. {(1, 3), (2, 3), (3, 3), (8, 3)}

C. {(1, 2), (2, 2), (3, 3), (8, 8)}

D. {(8, 3), (8, 2), (8, 1), (8, 8)}

Answer: B

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14. If A = {1, 2, 3, 4} then the number of elements in $A \times A$ is

A. 4

B. 8

C. 12

D. 16

Answer: D

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15. Let A = {1, 2, 3, 4}, B= {2, 3, 4, 5}, then $n[(A \times B) \cap (B \times A)]$ is

A. 3

B. 6

C. 9

D. 16

Answer: C

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16. If A = {2, 4} and B= {3, 4, 5}, then $(A \cap B) \times (B \cup A)]$

A. {(2, 2), (3, 4), (4, 2), (5, 4)}

B. {(2, 3), (4, 3), (4, 5)}

C. {(2, 4), (3, 4), (4, 4), (4, 5)}

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

Answer: D

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

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

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18. If $aN = \{an : n \in N\}$ and $bn \cap cN = dN$ where a, b, c, d in N and b, c are relatively prime then

A. 1)d=b+c

B. 2)d=bc

C. 3)d=b-c

D. 4)d=b/c

Answer: B

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19. Let $N = \underset{a}{(an : n \in N)}$, then $N \in \underset{6}{N}_{8}$ is equal to

A. N_2

B. N_{48}

C. N_8

D. N_{24}

Answer: D

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20. Sets A and B have 3 and 6 elements respectively. What can be the minimum number of elements in A $\cup$ B ?

A. 3

B. 6

C. 9

D. 18

Answer: B

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21. If A and B are two finite sets such that $A \cap B \neq \phi$, then $n(A \cup B)$ =

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

B. $n(A) + n(B) + n(A \cap B)$

C. $n(A) + n(B) - n(A \cap B)$

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

Answer: C

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22. If A and B are finite sets and $A \subset B$ then

A. $n(A \cup B) = n(A)$

B. $n(A \cap B) = n(B)$

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

D. none of these

Answer: C

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23. If A and B are any two finite sets then $n(A) + n(B)$ is equal to

A. $n(A \cup B)$

B. $n(A \cap B)$

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

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

Answer: C

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24. In a group of 75 persons every one takes either tea or coffee. If 45 take tea and 35 take coffee, then the Number of persons who take tea only (and not coffee) is

A. 35

B. 40

C. 45

D. 50

Answer: B

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25. Two finite sets A and B have m and n elements. Number of subsets of A is 56 more than that of B. The values of m and n are

A. 6, 3

B. 7, 6

C. 7, 3

D. 6, 4

Answer: A

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26. If A and B are two sets such that n (A) = 70 , n (B) = 60 and $n(A \cup B)$ = 110 , then $n(A \cap B)$

A. 240

B. 50

C. 40

D. 20

Answer: D

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27. Let n(U) = 700 , n (A) = 200 , n (B) = 300 and $n(A \cap B)$ =100, then $n(A' \cap B')$=

A. 400

B. 600

C. 300

D. 200

Answer: C

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28. R be the relation on the set N of natural numbers, defined by xRy if and only if $x + 2y = 8$. The domain of R is

A. {2, 4, 7}

B. {1, 2, 4}

C. {2, 4, 6}

D. {2, 6, 8}

Answer: C

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29. Let $A = (a, b, c)$ and $R = \{(a, a), (b, b), (a, b), (b, a), (b, c)\}$ be a relation on A, then R is

A. reflexive

B. symmetric

C. transitive

D. none of these

Answer: D

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30. Let `X ={1, 2, 3} and R = {(1, 1), (2, 2), (3, 3), (2, 3)} be a relation on the X.Then which one is not true

A. R is reflexive

B. R is tranisitive

C. R is antisymmetric

D. R is symmetric

Answer: D

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31. Let A = {2, 4, 6, 8} and define R = {(2, 4), (4, 2), (4, 6), (6, 4)} then R is

A. Reflexive

B. symmetric

C. transitive

D. anti transitive

Answer: B

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32. Let $A = \{P, Q, R, S\}$ and $B = \{1, 2, 3\}$ which of the following relations from A to B is not a function.

A. $R_1 = \{(p, 1), (q, 2), (r, 1), (s, 2)\}$

B. $R_2 = \{(p, 1), (q, 1), (r, 1), (s, 1)\}$

C. $R_3 = \{(p, 1), (q, 2), (p, 2), (s, 3)\}$

D. $R_4 = \{(p, 2), (q, 3), (r, 2), (s, 2)\}$

Answer: C

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33. Let A = (p, q, r) which of the following is an equvilance relation on A?

A. $R_1 = \{(p, q), (q, r), (p, r), (p, p)\}$

B. $R_2 = \{(r, p), (q, p), (r, r), (q, q)\}$

C. $R_3 = \{(p, p), (q, q), (r, r), (p, q)\}$

D. $R_4 = \{(p, p), (q, q), (r, r)\}$

Answer: D

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34. In the set $X = \{a, b, c, d\}$ which of the following relation is a function?

A. $R_1 = \{(b, a), (a, b), (c, d), (a, c)\}$

B. $R_2 = \{(a, d), (d, c), (b, b), (c, c)\}$

C. $R_3 = \{(a, b), (b, c), (c, d), (b, d)\}$

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

Answer: B

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

A. reflexive

B. symmetric

C. transitive

D. none of these

Answer: C

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36. The relation $R = \{(1, 1), (2, 2), (3, 3)\}$ on the set of {1, 2, 3] is

A. symmetric only

B. reflexive only

C. an equivalance relation

D. transitive only

Answer: C

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37. If $A = \{2, 3, 4, 5\}$, then which of the following relations is a function from A to itself

A. $f_1 = \{(x, y) : y = x + 1\}$

B. `f_{2}= {(x,y): x+Y gt 6}

C. $f_3 = \{(x, y) : x > y\}$

D. $f_4 = \{(x, y) : x + y = 7\}$

Answer: D

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38. In the set $X = \{a, b, c, d\}$ which of the following relation is a function?

A. $R_1 = \{(b, a), (a, b), (c, d), (a, c)\}$

B. $R_2 = \{(a, d), (d, c), (b, b), (c, c)\}$

C. $R_3 = \{(a, b), (b, c), (c, d), (b, d)\}$

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

Answer: B

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39. Let $A = \{1, 2, 3\}$ and $B = \{2, 3, 4\}$, then which of the following relation from A to B is a function from A into B

A. {(2, 2), (1,3), (2,4), (3,2)}`

B. {(1, 4), (2,4), (3, 4)}

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

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

Answer: B

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40. Let $A = \{P, Q, R, S\}$ and $B = \{1, 2, 3\}$ which of the following relations from A to B is not a function.

A. $R_1 = \{(p, 1), (q, 2), (r, 1), (s, 2)\}$

B. $R_2 = \{(p, 1), (q, 1), (r, 1), (s, 1)\}$

C. $R_3 = \{(p, 1), (q, 2), (p, 2), (s, 3)\}$

D. $R_4 = \{(p, 2), (q, 3), (r, 2), (s, 2)\}$

Answer: C

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41. Let $A = \{1, 2, 3, 4\}$ and $B = \{1, 2\}$. Then the number of onto functions from A onto B is

A. 14

B. 16

C. 12

D. 8

Answer: A

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42. If $n \geq 2$ then the number of onto mappings (surjections) that can be defined from the set $A = \{1, 2, 3. . ., n\} on \rightarrow$ B = {a, b}` is

A. n^2

B. 2^n

C. $n^2 - 2$

D. $2^n - 2$

Answer: D

Watch Video Solution

43. If $f: A \to B$ is surjective then

A. $n(A) \leq n(B)$

B. $n(A) = n(B)$

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

D. none of these

Answer: C

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44. Let $f(x) = \frac{2x+1}{1-3x}$, then $f^{-1}(x)$ =

A. $\frac{x-1}{3x+2}$

B. $\frac{3x+2}{x-1}$

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

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

Answer: A

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45. If A = (x: x = $\frac{1}{y}$, $y \in N$), where N is the set of natural numbers , then

A. $0 \in A$

B. $1 \in A$

C. $2 \in A$

D. $\frac{2}{3} \in A$

Answer: B

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46. If $f(x) = 1 + x^4$, then $f(x).\, f\left(\frac{1}{x}\right) =$

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

B. $f(x) - f\left(\frac{1}{x}\right)$

C. $f(x) \div f\left(\frac{1}{x}\right)$

D. none of these

Answer: A

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47. If $f(x) = \cos(\log x)$, then $f\left(\frac{1}{x}\right) f\left(\frac{1}{y} - \frac{1}{2}\left[f\left(\frac{x}{y}\right) + \text{f(xy)}\right] =\right.$`

A. $\cos(x - y)$

B. $\log[\cos(x + y)]$

C. 1

D. 0

Answer: D

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48. Two functions $f: R \to R$ and $g: R \to R$ are defined as below

$$f(x) = \begin{cases} 0 & x\ is\ rotational \\ 1 & xisirrational \end{cases}$$

A. -1

B. 0

C. 1

D. 2

Answer: A

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

A. 1)$-1 < ex < e = \sqrt{3}$

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

C. 3)$-2 \leq x \leq 2$

D. 4)none of these

Answer: B

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50. If $g(x) = 1 + \sqrt{x}$ and $f(g(x)) = 3 + 2\sqrt{x} + x$ then f(x) =

A. $1 + 2x^2$

B. $2 + x^2$

C. $1 + x$

D. $2 + x$

Answer: B

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

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

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

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

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

Answer: B

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52. On the set Z of all integers define $f: Z-(0) \to Z$ as follows

$f(n) = \begin{cases} \frac{n}{2} & n\ is\ even \\ \frac{2}{0} & n\ is\ odd \end{cases}$ then f is

A. onto but not one-one

B. one-one but not onto

C. one-one and onto

D. into

Answer: A

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53. The mapping $f: R^+ \to R$ defined by $f(x) = \log_{10} x$, (Where R^+ is the set ofall positive real numbers) is

A. only one-one mapping

B. only onto mapping

C. both one-one and onto

D. none of these

Answer: C

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54. The function $f(x) = 10^x$ from the set R of real numbers to $[0, \infty)$ is

A. one-one and onto

B. one-one and into

C. a constant function

D. an identify function

Answer: B

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55. If R denotes the set of all real numbers than the function $f: R \to R$ defined by $f(x) = |x|$

A. one-one only

B. onto only

C. both one-one and onto

D. neither one-onto nor onto

Answer: D

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56. If $f: N \times N \to N$ is such that $f(m, n) = m + n$, for all $n \in N$, where N is the set of all natural numbers, then which of the following is true?

A. f is one-one but not onto

B. f is neither one-one nor onto

C. f is one-one and onto

D. f is onto but not one-one

Answer: B

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57. If $f(x) = \frac{2^x - 2^{-x}}{2^x + 2^{-x}}$, then $f^{-1}(x)$ is :

A. $\frac{1}{2}\log_2, \left(\frac{x}{1-x}\right)$

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

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

D. $\frac{1}{2}\log_2, \left(\frac{2+x}{2-x}\right)$

Answer: B

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

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

B. x

C. $\cos x$

D. $\tan^2\left(\frac{x}{2}\right)$

Answer: C

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59. If $f(x) = \frac{x-3}{x+1}$, then $f[f\{f(x)\}]$=

A. x

B. $-x$

C. 4x

D. $-4x$

Answer: A

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

A. x

B. x-1

C. 1-x

D. 1+x

Answer: C

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

A. 0

B. 1

C. x

D. 1/x

Answer: D

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62. The number of bijective functions from the set A to itself, if A contains 108 elements is :

A. 108

B. (108)!

C. $(108)^2$

D. 2^108'

Answer: B

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63. If $f: R \to R$ be defined by ,$f(x) = 10x - 7$ and$g = f^{-1}$, then g(x)

A. $1/10x - 7$

B. $1/10x + 7$

C. `x+7//10'

D. $x - 7/10$

Answer: C

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64. Let A be a set containing 10 distinct elements . Then the total number of distinct functions from A to A is :

A. 10!

B. 10^{10}

C. 2^{10}

D. 2^{10}-1

Answer: B

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65. If the set A has 3 elements and the set B has 4 elements, then the number of injections (one - one) that can be defined from A to B is

A. 144

B. 12

C. 24

D. 64

Answer: C

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66. The number of bijective functions from the set A to itself if a contains 108 elements is

A. 108

B. 108^3

C. 108!

D. 2^{106}

Answer: C

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67. If $f(x) = \frac{3x+2}{5x-3}$, then :

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

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

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

D. $f^{-1}(x) = \frac{1}{19}f(x)$

Answer: A

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68. 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

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

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

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

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

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

Answer: C

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70. If $f(x) = x^2 - 3x + 1$ and $f(2\alpha) = 2$ x f(alpha)`=

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

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

C. $\frac{1}{\sqrt{2}}$ or $-\frac{1}{\sqrt{2}}$

D. $\pm\sqrt{2}$

Answer: C

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71. The $f(x)$ is such that $f(x+y)=f(x)+f(y)$, for all reals x and $y\times$ then $f(0)$=

A. 1

B. 0

C. $f(x),\ \forall x$

D. -1

Answer: B

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72. If $f(x) = 3^1 + \log x / x^{\log 3}$, then f(2005) is

A. log(2005)

B. (2005) log 3

C. $1/2005$

D. 3

Answer: D

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73. Let $f: I \to I$ be defined by$f(x) = x + k$ where k is a fixed integer and I is the set of all integers then f is

A. one-one but not onto

B. onto but not one-one

C. does not have an inverse

D. both one-one and onto

Answer: D

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

A. a)1

B. b)3

C. c)-1

D. d)-2

Answer: A

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75. The functon $f: N \to N$, defined by $f(n) = 2n + 3$, for all $n \in N$, is (here N is the set of natural numbers)

A. only onto

B. only one-one

C. both one-one and onto

D. none of these

Answer: B

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76. If $f: C \to C$, Where C is the set of all complex numbers, is defined by $f(x) = x^3$, $\forall x \in C$, then $f^{-1}(64) =$

A. 4

B. (4, -4)

C. ϕ

D. $\left(4, 4\infty, 4\infty^2\right.$

Answer: D

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77. If $f: C \to C$, Where C is the set of all complex numbers, is defined by $f(x) = x^4, \forall x \in C$, then $f^{-1}(256) =$

A. 4

B. (4, -4)

C. (4, -4, 4i, -4i)

D. ϕ

Answer: C

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78. If $f(x) = \frac{(a - x^n)^1}{n}$, $a > 0$, n is a postive integer then $f[f(x)] =$

A. x

B. x^2

C. x^3

D. x^n

Answer: A

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79. If f(x) is a ploynomial function satisfying $f(x).f\left(\frac{1}{x}\right) = f(x) + f\left(\frac{1}{x}\right)$ and f(3)=28, then f(2) is

A. 63

B. 62

C. 49

D. 9

Answer: D

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80. The number of functions from the set A into the set B, when $n(A) = 7$ and $n(B) = 5$ is

A. 7^5

B. 5^7

C. 7!

D. $7C_5$

Answer: B

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81. If $n(A) = 15$ and $n(B) = 10$, then number of injective (one-one) mapping from A into B is

A. $15C_{10}$

B. 15!

C. 0

D. 10!

Answer: C

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82. The domain of the function $f(x) = \cot 5x$ is

A. $R - \frac{n\pi}{2}$

B. $R - n\pi$

C. $R - \frac{n\pi}{5}$

D. $R + n\pi$

Answer: C

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83. The domain of the function $f(x) = \tan 3x$ is

A. $R - \left\{(2n+1)\frac{\pi}{3}\right\}$

B. $R - \left\{(2n+1)\frac{\pi}{6}\right\}$

C. $R - \left\{(2n+1)\frac{\pi}{2}\right\}$

D. $R - 2n\pi$

Answer: B

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84. The domain of $f(x) = \sqrt{(x-7)(9-x)}$ is

A. (7, 9)

B. [7, 9)

C. [7, 9)

D. [7, 9]

Answer: D

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85. The domain of the function

$f(x) = \frac{1}{\sqrt{(x-6)(x-9)}}$ is

A. $(-\infty, 6] \cup (9, \infty)$

B. $(-\infty, 6] \cup [9, \infty)$

C. $(-\infty, 6) \cup [9, \infty)$

D. $(-\infty, 6) \cup (9, \infty)$

Answer: D

Watch Video Solution

86. The domain of the function $f(x) = \sqrt{\frac{x-7}{x-9}}$ is

A. $(-\infty, 7] \cup (9, \infty)$

B. $(-\infty, 7) \cup [9, \infty)$

C. $(-\infty, 7) \cup (9, \infty)$

D. $(-\infty, 7] \cup [9, \infty)$

Answer: A

Watch Video Solution

87. The domain of the function $f(x) = \sqrt{\frac{x-5}{x-4}}$ is

A. $(-\infty, 4] \cup (5, \infty)$

B. $(-\infty, 4] \cup (5, \infty)$

C. $(-\infty, 4] \cup [5, \infty)$

D. $(-\infty, 4] \cup [5, \infty)$

Answer: C

Watch Video Solution

88. The function $f: N \to N$, Where N is the set of natural numbers, defined by $f(x) = 3x + 4$ is

A. surjective

B. injective

C. both surjective and injective

D. neither surjective nor injective

Answer: B

Watch Video Solution

89. If $f(x) = \log\left(\frac{1+x}{1-x}\right)$ and $g(x) = \frac{3x + x^3}{1 + 3x^2}$, then $f(g(x))$ is equal to :

A. $-f(x)$

B. $3f(x)$

C. $(f(x))^3$

D. $f(3x)$

Answer: B

Watch Video Solution

90. The domain of the function $f(x) = \sqrt{\frac{x-7}{9-x}}$ is

A. $7 \leq x \leq 9$

B. $7 \leq x \leq 9$

C. $7 \leq x \leq 9$

D. $7 < x < 9$

Answer: A

Watch Video Solution

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

A. R

B. $x > 0$

C. $x \leq 0$

D. ϕ

Answer: A

Watch Video Solution

92. Range of $f(x) = 5\cos x - 3\sin x + 2$ is

A. $[2-\sqrt{34}, 2+\sqrt{34}]$

B. $[-\sqrt{34}, \sqrt{34}]$

C. $[\sqrt{34}-2, 2+\sqrt{34}]$

D. $\left[-\frac{1}{2}\sqrt{34}, \frac{1}{2}\sqrt{34}\right]$

Answer: A

Watch Video Solution

93. Let $f(x)=1-x^5$, then $f(x).f\left(\frac{1}{x}\right)=$

A. $f(1)$

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

C. $f(x)$

D. $f(0)$

Answer: B

Watch Video Solution

94. If $f(x)$ is a polynomial even function such that $f(x).f\left(\frac{1}{x}\right) = f(x) + f\left(\frac{1}{x}\right)$ and $f(2) = 65$, then $f(-3)$=

A. 729

B. 723

C. 730

D. 731

Answer: C

Watch Video Solution

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

Then $(gof)(x)$ is :

A. 1

B. -1

C. x

D. 1/x

Answer: A

Watch Video Solution

96. If $A = \phi$, then the number elements in P(A), (i.e., the number of elements in the power set of A) is

A. 0

B. 1

C. P(A) not defined

D. 2

Answer: B

Watch Video Solution

97. A and B are two sets such that $n(A) = 22$ and $n(B) = 37$, then maximum number of elements in $A \cap B$ is

A. 37

B. 22

C. 15

D. 59

Answer: B

Watch Video Solution

98. A and B are two sets such that $n(A) = 25$ and $n(B) = 15$, then maximum number of elements in $A \cup B$ is

A. 40

B. 10

C. 25

D. 15

Answer: A

Watch Video Solution

99. If A and B are two sets such that n (A) = 5 , n (B) = 7, then the minimum number of elements in $A \cup B$ is

A. 5

B. 12

C. 2

D. 7

Answer: D

Watch Video Solution

100. A and B are two sets such that n(A) = 30 and n(B)=41, then $n(A \cup B)$ is

A. equal to 41

B. less than 70

C. greater than 41

D. less than 41

Answer: C

Watch Video Solution

101. A and B are two sets such that n(A) = 27 and n(B)=32, then $n(A \cap B)$ is

A. equal to 27

B. equal to 32

C. less than 27

D. greater than 32

Answer: C

Watch Video Solution

102. If A_n is the set of first n primes then $big \cap_{n=3}^{10} A_n =$

A. {3, 5, 7, 11, 13, 17, 19}

B. {2, 3, 5}

C. {2, 3, 5, 7, 11, 13, 17}

D. {3, 5, 7}

Answer: B

Watch Video Solution

103. If A_n is the set of first n primes than, $\cup_{n=2}^{10} A_n =$

A. {2, 3, 5, 7, 11, 13, 17, 19}

B. {2, 3, 5, 7, 11, 13, 17, 19, 23, 29}

C. {3, 5}

D. {2, 3}

Answer: B

Watch Video Solution

104. If n(U) = 300, n(A)= 115, n(B)= 125 and $n(A \cup B)$ = 140 then $n[(A \cap B)]$ =

A. 100

B. 150

C. 200

D. 175

Answer: C

Watch Video Solution

105. If n(U) = 100, n(A)=50, n(B)=20 and $n(A \cap B)$ = 10, then $n\{(A \cup B)\}$ =

A. 60

B. 30

C. 40

D. 20

Answer: C

Watch Video Solution

106. Two finite sets have m and n elements. The Number of elements is the power set of first set is 48 more than the power set of second set. Then(m, n) =

A. (7, 6)

B. (6, 3)

C. (6, 4)

D. (7, 4)

Answer: C

Watch Video Solution

107. If A = {x : x is a multiple of 2} B = {x : x is a multiple of 5}, then A-B is

A. $A' \cap B$

B. $A \cap B'$

C. $A' \cap B'$

D. $(A \cap B)'$

Answer: B

Watch Video Solution

108. If A = $\{(x, y) : x^2 = y, x, y \in R\}$

B = $\{(x, y) : y = |x|, x, y \in R\}$ then

A. $A \cap B = \phi$

B. $A \cap B$ = singleton set

C. $A \cap B$ = contains two elements

D. $A \cap B$ contains three elements

Answer: D

Watch Video Solution

109. If A = $\{(x, y) : y^2 = x, x, y \in R\}$, B = $\{(x, y) : y = |x|, x, y \in R\}$, then

A. $A \cap B = \phi$

B. $A \cap B$ = singleton set

C. $A \cap B$ contains two elements

D. $A \cap B$ contains three elements

Answer: C

Watch Video Solution

110. If $A = \left\{(x, y) : y = \frac{4}{x}, x \neq 0\right\}$ and $B = \left\{(x, y) : x^2 + y^2 = 8, x, y \in R\right\}$ then

A. $A \cap B = \phi$

B. $A \cap B$ contains one point only

C. $A \cap B$ contains two points only

D. $A \cap B$ contains four point only

Answer: C

Watch Video Solution

111. A survey shows that 65% of Americans like cheese where as79% like oranges. If x% of the Americans like both than

A. x=34

B. x=44

C. x=54

D. x=64

Answer: B

Watch Video Solution

112. If A = {1, 2, 3, 4, 5, 6} then how many subsets of A contain the elements 2, 3 and 5?

A. 4

B. 8

C. 16

D. 32

Answer: B

Watch Video Solution

113. If P is the set of all parallelograms and T is the set of all trapeziums then $P \cap T$ is

A. ,P

B. T

C. ϕ

D. none of these

Answer: B

Watch Video Solution

114. A and B are any two non-empty sets and A is a proper subset of B. If n(A) = 5, then find the minimum possible value of $n(A \Delta B)$

A. a.is 1

B. b.is 5

C. c.6

D. d.can not be determined

Answer: A

Watch Video Solution

115. In an election, two persons A and B contested. x% of the total voter voted for A and (x+20)% for B. If 20% of the voters did not vote, then x =

A. 30

B. 25

C. 40

D. 35

Answer: A

Watch Video Solution

116. Let R be the real line, Consider the following subsets of the plane $R \times R$:

$S = \{(x, y) : y = x + 1 \text{ and } 0 < x < 2\}$

$T = \{(x, y) : x - y \text{ is an integer}\}$.

Which one of the following is true ?

A. S is an equivalence relation on R but T is not

B. T is an equivalence relation on R but S is not

C. Neither S nor T is an equivalence relation on R

D. Both S and T are equivalence relations on R

Answer: B

Watch Video Solution

117. The number of equivalence relation that can be defined on (a, b, c) is

A. 3

B. 5

C. 7

D. 8

Answer: D

Watch Video Solution

118. The relation 'is not equal to' is defined on R, is

A. reflexive only

B. symmetric only

C. transitive only

D. equivalence

Answer: B

Watch Video Solution

119. The inverse of function $f: R \to \{x \in R: x < 1\}$ given by $f(x) = \frac{e^x - e^{-x}}{e^x + e^{-x}}$ is

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

B. $\frac{1}{2}\log\left(\frac{2+x}{2-x}\right)$

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

D. none of these

Answer: A

Watch Video Solution

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

A. (-1, 1)

B. (0, 1)

C. (-1, 0)

D. none of these

Answer: A

Watch Video Solution

121. Let $f: [2, \infty) \to X$ be defined by $f(x) = 4x - x^2$. Then, f is invertible if X =

A. $[2, \infty)$

B. $(-\infty, 2]$

C. $(-\infty, 4]$

D. $[4, \infty)$

Answer: C

Watch Video Solution

122. If the function $f: R \to A$ given by $f(x) = \frac{x^2}{x^2+1}$ is a surjective then A =

A. R

B. [0, 1]

C. (0, 1]

D. [0, 1)

Answer: D

Watch Video Solution

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

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

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

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

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

Answer: C

Watch Video Solution

124. If $f(x)$ is defined on [0,1] by the rule $f(x) = \begin{cases} x & \text{if } x \text{ is rational} \\ 1-x & \text{if } x \text{ is irrational} \end{cases}$

A. constant

B.

C.

D.

Answer: C

View Text Solution

125. Let $f(x) = \frac{ax + b}{cx + d}$. Then $fof(x) = x$, then

A. d = -a

B. d = a

C. a = b = c = d = 1

D. a = b = 1

Answer: A

Watch Video Solution

126. If $f(x) = x^n, n \in N$ and $gof(x) = ng(x)$, then g(x) can be

A. $n|x|$

B. $3\frac{x^1}{3}$

C. e^x

D. $\log|x|$

Answer: D

Watch Video Solution

127. The function $f: R \to R$ given by

$f(x) = 5 - 3\sin x$

A. only one-one

B. only onto

C. both one-one and onto

D. neither one-one nor onto

Answer: D

View Text Solution

128. If $g(x) = 1 + \sqrt{x}$ and $f(g(x)) = 3 + 2\sqrt{x} + x$ then f(x) =

A. $1 + 2x^2$

B. $2 + x^2$

C. 1+x

D. 2+x

Answer: B

Watch Video Solution

129. The inverse of the function $f: R \to R$ given by $f(x) =$ log_{a} (x+sqrt(x^2+1)(a gt 0, a ne 1)` is

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

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

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

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

Answer: B

Watch Video Solution

130. If $f(x) = \log\left(\frac{1+x}{1-x}\right)$, then $f\left(\frac{2x}{1+x^2}\right)$

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

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

C. $2f(x)$

D. $3f(x)$

Answer: C

View Text Solution

131. If $f(x) = \frac{\sin^4 x + \cos^2 x}{\sin^2 x + \cos^4 x}$ for $x \in R$, then f(2013)=

A. 1

B. 2

C. 3

D. 4

Answer: A

Watch Video Solution

132. If $f: R \to R$ and $g: R \to R$ are defined by $f(x) = 3x + 2$ and $g(x) = x^2 - 3$, then the value of x such that $g(f(x)) = 4$ are

A. a.$-\frac{1}{3}, 1$

B. b.$-\frac{1}{3}, -1$

C. c.1/3, -1

D. d.1/3, 1

Answer: B

Watch Video Solution

133. The function $f: R \to R$ defined by $f(x) = 7^x + 7^{|x|}$ is

A. a.one- one and onto

B. b.many one and onto

C. c.one-one and onto

D. d.many one and into

Answer: C

Watch Video Solution

134. . If $A_1, A_2, \ldots\ldots, A_{100}$ are sets such that $n(A_i) = i + 2, A_1 \subset A_2 \subset A_3 \subset \ldots. \subset A_{100}$ and $A = big \cap_{i=3}^{100} A_l$ then

A. 3

B. 4

C. 5

D. 6

Answer: C

View Text Solution

135. If $A_1 \subset A_2 \subset A_3 \subset \ldots. \subset A_{70}$ and $n(A_i)$=i-3$then$, n(bignn_(i=10)^(70))=`

A. 5

B. 7

C. 9

D. 11

Answer: B

View Text Solution

136. If $A_1 \subset A_2 \subset A_3 \subset \ldots \subset A_{79}$ and $n(A_i) = i + 2$ then,$n\left(\bigcup_{i=1}^{79} A_i\right)$ =

A. 80

B. 81

C. 90

D. 91

Answer: B

View Text Solution

137. Let F_1 be the set of parallelograms , F_2 the set of rectangles, F_3 the set of rhombuses , F_4 the set of squares and F_5 the set of trapeziums in a plane. Then F_1 may be equal to :

A. $F_2 \cap F_3$

B. $F_3 \cap F_4$

C. $F_2 \cup F_5$

D. $F_2 \cup F_3 \cup F_4 \cup F_5$

Answer: D

Watch Video Solution

138. Let, S = set of points inside the square

T = set of points inside the triangle

C= set of points inside the circle, If the triangle and circle intersect each other and are contained in a square, then

A. $S \cap T \cap C = \phi$

B. $S \cup T \cup C = C$

C. $S \cup T \cup C = S$

D. $S \cup T = S \cap C$

Answer: C

Watch Video Solution

139. Two finite sets have m and n elements. The number of subsets of the first set is 112 more than that of the second set. The values of m and n are , respectively :

A. 4, 7

B. 7, 4

C. 4, 4

D. 7, 7

Answer: B

Watch Video Solution

140. 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 with 3 elements, let

$\cup_{i=1}^{30} A_i = \cup_{j=1}^{n} B_j = S$ and each element of S belongs to exactly 10 of A'_i and exactly 9 of B'_j . Then n is equal to :

A. 15

B. 3

C. 45

D. 35

Answer: C

Watch Video Solution

141. Let R be the set of points inside a rectangle of sides a and b with two sides along the positive directions of x-axis and y-axis . Then :

A. $R = \{(x, y) : 0 \leq x \leq a, 0 \leq y \leq b\}$

B. $R = \{(x, y) : 0 \leq x \leq a, 0 \leq y \leq b\}$

C. $R = \{(x, y) : 0 \leq x \leq a, 0 < y < b\}$

D. $R = ((x, y) : 0 < x < a, 0 < y < b)$

Answer: D

Watch Video Solution

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

A. 0

B. 25

C. 35

D. 45

Answer: B

Watch Video Solution

143. In a town of 840 persons, 450 persons read Hindi, 300 read English and 200 read both. Then the number of persons who read neither is :

A. 210

B. 290

C. 180

D. 260

Answer: B

Watch Video Solution

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

A. $X \subset Y$

B. $Y \subset X$

C. X=Y

D. $X \cap Y = \phi$

Answer: A

Watch Video Solution

145. If the sets A and B are defined as :

$A = \left\{(x, y) : y = \frac{1}{x}, 0 \neq x \in R\right\}$, B={(x,y) : y=-x , x $\in$ R}, then :

A. $A \cap B = A$

B. $A \cap B = B$

C. $A \cap B = \phi$

D. $A \cup B = A$

Answer: C

Watch Video Solution

146. A survey shows that 63% of the people watch at news channel whereas 76% watch another channel. If x% of the people watch both

channels , then :

A. x = 35

B. x = 63

C. $39 \leq x \leq 63$

D. x = 39

Answer: C

Watch Video Solution

147. If A and B are two sets , then $A \cap (A \cup B)$ equals :

A. A

B. B

C. ϕ

D. $A \cap B$

Answer: A

Watch Video Solution

148. If A={1,3,5,7,9,11,13,15,17},B={2,4,..., 18} and N is the universal set, then $A^c \cup ((A \cup B) \cap B^c)$ is :

A. ϕ

B. N

C. A

D. B

Answer: B

Watch Video Solution

149. If X and Y are two sets and X^c denotes the complement of X, then $X \cap (X \cup Y)^c$ is equal to :

A. X

B. Y

C. ϕ

D. $X \cap Y$

Answer: C

Watch Video Solution

150. Let S {x |x is a positive multiple of 3 less then 100},

P ={x|x is a prime number less than 20}

Then n(S)+n(P) is

A. 34

B. 41

C. 33

D. 30

Answer: B

Watch Video Solution

151. Let n(A) = m and n(B) = n. Then the total number of non-empty relations that can be defined from A to B is

A. m^n

B. $n^m - 1$

C. mn-1

D. $2^{mn} - 1$

Answer: D

Watch Video Solution

152. Let T be the set of all trianges in the Euclidean plane and let a relation R on T be defined as a R b, if a is congruent to b, for all $a, b \in T$ Then R is

A. reflexive but not transitive

B. transitive but not symmetric

C. equivalence relation

D. none of these

Answer: C

Watch Video Solution

153. Consider the non-empty set consisting of children in a family and a relation R defined by a R b if a is brother of b. Then R is

A. symmetric but not transitive

B. transitive but not symmetric

C. neither symmetric nor transitive

D. both symmetric and trannsitive

Answer: D

Watch Video Solution

154. If a relation R on the set {1, 2, 3} be defined by $R = \{(1, 2)\}$, then R is

A. reflexive

B. transitive

C. symmetric

D. none of these

Answer: B

Watch Video Solution

155. Let us define a relation R on the set R of real numbers as a R b if $a \geq b$. Then R is

A. an equivalence relation

B. reflexive, transitive but not symmetric

C. symmetric, transitive but not reflexive

D. neither transitive nor reflexive but symmetric

Answer: B

Watch Video Solution

156. Let A = {1, 2, 3} and consider the relation R = {(1, 1), (2, 2), (3, 3), (1, 2), (2, 3), (1, 3)}. Then R is

A. reflexive but not symmetric

B. reflexive but not transitive

C. symmetric and transitive

D. neither symmetric nor transitive

Answer: A

Watch Video Solution

157. If a set A contains 5 elements and the set B contains 6 elements, then the number of one-one and onto mapping from A to B is

A. 720

B. 120

C. 0

D. none of these

Answer: C

Watch Video Solution

158. Let A = {1, 2, 3, ..., n} and B = {a, b}. Then the number of surjection from A into B is

A. nP_2

B. $2^n - 2$

C. $2^n - 1$

D. none of these

Answer: B

Watch Video Solution

159. If $[x]^2 - 5[x] + 6 = 0$, where $[.]$ denotes the greatest integer function, then :

A. $x \in [3, 4]$

B. $x \in [2, 3]$

C. $x \in [2, 3]$

D. $x \in [2, 4)$

Answer: D

Watch Video Solution

160. Range of $f(x) = \dfrac{1}{1-2\cos x}$ is

A. 1) $\left[\dfrac{1}{3}, 1\right]$

B. 2) $\left[-1, \dfrac{1}{3}\right]$

C. 3) $(-\infty, -1) \cup \left[\dfrac{1}{3}, \infty\right)$

D. 4) $\left[-\dfrac{1}{3}, 1\right]$

Answer: C

Watch Video Solution

161. 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

Answer: C

Watch Video Solution

162. Domain of $\sqrt{a^2 - x^2}(a > 0)$ is :

A. (-a,a)

B. [-a, a]

C. [0, a]

D. (-a, 0]

Answer: B

Watch Video Solution

163. If $f(x) = ax + b$ where a and b are integers, $f(-1) = -5$ and $f(3) = 3$, then a and b are equal to :

A. a=-3, b = -1

B. a = 2, b = -3

C. a = 0, b = 2

D. a = 2, b = 3

Answer: B

Watch Video Solution

164. The domain of the function f defined by :

$f(x) = \sqrt{4 - x} + \frac{1}{\sqrt{x^2 - 1}}$ is equal to :

A. $(-\infty, -1) \cup (1, 4]$

B. $(-\infty, -1) \cup (1, 4)$

C. $(-\infty, -1) \cup [1, 4]$

D. $(-\infty, -1) \cup [1, 4)$

Answer: A

Watch Video Solution

165. The domain and range of 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}

Answer: C

Watch Video Solution

166. The domain and range of real function f defined by

$f(x) = \sqrt{x-1}$ is given by :

A. Domain = $(1, \infty)$, Range = $(0, \infty)$

B. Domain = $[1, \infty)$, Range = $(0, \infty)$

C. Domain = $[1, \infty)$, Range = $[0, \infty)$

D. Domain = $[1, \infty)$, Range = $[0, \infty]$

Answer: C

Watch Video Solution

167. Find the domain of the function $f(x) = \frac{x^2 + 3x + 5}{x^2 - 5x + 4}$

A. R-(3, -2)

B. R-(-3, 2)

C. R-[3, -2]

D. R-(3, -2)

Answer: A

Watch Video Solution

168. The domain and range of the function f given by :

$f(x) = 2 - |x - 5|$ is :

A. Domain = R^+, $Ran \geq = (-\infty, 1]$

B. Domain = R, Range = $(-\infty, 2]$

C. Domain = R, Range = (- oo,2]

D. Domain = R^+, $Ran \geq = (-\infty, 2]$

Answer: B

Watch Video Solution

169. The domain for which the function defined by $f(x) = 3x^2 - 1$ and $g(x) = 3 + x$ are equal is

A. 1) $\left\{-1, \frac{4}{3}\right\}$

B. 2) $\left\{-1, -\frac{4}{3}\right\}$

C. 3) $\left\{1, -\frac{4}{3}\right\}$

D. 4) $\left\{1, -\frac{4}{3}\right\}$

Answer: A

Watch Video Solution

170. Let $f: R \to R$ be defined by $f(x) = \frac{1}{x} \forall x \in R$, then f is _____

A. one-one

B. onto

C. bijective

D. f is not defined

Answer: D

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171. Let $f: R \to R$ be defined by $f(x) = 3x^2 - 5$ and $g: R \to R$ by $g(x) = \frac{x}{x^2 + 1}$ $\times$ Then gof is

A. 1) $\frac{3x^2 - 5}{9x^4 - 30x^2 + 26}$

B. 2) $\frac{3x^2 - 5}{9x^4 - 6x^2 + 26}$

C. 3) $\frac{3x^2}{x^4 + 2x^2 - 4}$

D. 4) $\frac{3x^2}{9x^4 + 30x^2 - 2}$

Answer: A

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172. Which of the following functions from Z into Z is a bijection?

A. 1) $f(x) = x^3$

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

C. 3) $f(x) = 2x + 1$

D. 4) $f(x) = x^2 + 1$

Answer: B

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173. Let $f: R \to R$ be a function defined by $f(x) = x^3 + 5$. Then $f^{-1}(x)$ is

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

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

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

D. 5-x

Answer: B

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174. Let $f: A \to B$ and $g: B \to C$ be the bijective funtions. Then $(gof)^{-1}$ is

A. 1.$f^{-1}og^{-1}$

B. 2.fog

C. 3.$g^{-1}of^{-1}$

D. 4.gof

Answer: A

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175. If $f(x) = \frac{3x+2}{5x-3}$, then :

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

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

C. (fof)x = -x

D. $f^{-1}(x) = \frac{1}{19}f(x)$

Answer: A

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176. Let, $f:[0,1] \to [0,1]$ be defined by

$f(x) = \begin{cases} x & \text{if } x \text{ is rational} \\ 1-x & \text{if } x \text{ is irrational} \end{cases}$ Then $(fof)x$ is

A. 1)constant

B. 2)1+x

C. 3)x

D. 4)none of these

Answer: C

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177. Let $f:[2,\infty) \to R$ be the function defined by $f(x) = x^2 - 4x + 5$.

Then the range of f is

A. 1)R

B. 2)$[1,\infty)$

C. 3) $[4, \infty)$

D. 4) $[5, \infty)$

Answer: B

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178. Let, $f: N \to R$ be the function defined by $f(x) = \frac{2x-1}{2}$ and $g: Q \to R$ be another function defined by $g(x) = x + 2$ Then $gof\left(\frac{3}{2}\right)$ is

A. 1)1

B. 2)3

C. 3) $\frac{7}{2}$

D. 4)none of these

Answer: D

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

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

A. 9

B. 14

C. 5

D. none of these

Answer: A

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180. Let, $f: R \to R$ be given by $f(x) = \tan x$. Then $f^{-1}(1)$=

A. $\frac{\pi}{4}$

B. $\left\{n\pi + \frac{\pi}{4} : n \in Z\right\}$

C. does not exist

D. none of these

Answer: B

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181. If a set has n elements then the total number of subsets of A is

A. n

B. n^2

C. 2^n

D. $2n$

Answer: C

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

A. 15

B. 14

C. 16

D. 17

Answer: A

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183. 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

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184. Sets A and B have 3 and 6 elements respectively. What can be the minimum number of elements in A $\cup$ B ?

A. 3

B. 6

C. 9

D. 18

Answer: B

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185. If the sets A has p elements, B has q elements, then number of elements is $A \times B$ is

A. p+q

B. p+q+1

C. p q

D. p^2

Answer: C

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

A. {(a, b),(c, d)}

B. {(a, c),(a, d)}

C. {(a, c),(a, d),(b, d)}

D. {(c, a),(d, a)}

Answer: B

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187. If A ,B and C be three sets such that A ∪ B = A ∪ C and $A \cap B = A \cap C$, then :

A. A=B

B. B=C

C. A=C

D. A=B=C

Answer: B

Watch Video Solution

188. 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. not symmetric

B. transitive

C. a function

D. reflection

Answer: A

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189. Let W denote the words in the English dictionary. Define the relation R by:

$R = \{(x, y) \in W \times W$, the words x and y have at least one letter in common $\}$

Then R is :

A. reflexive, not symmetric and transitive

B. 2.not reflexive, symmetric and transitive

C. reflexive, symmetric and not transitive

D. reflexive, symmetric and transitive

Answer: C

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

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

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191. If two sets A and B are having 99 elements in common, then the number of elements common to each of the sets A x B and B x A is :

A. 2^{99}

B. 99^2

C. 100

D. 18

Answer: B

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192. Consider 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 $n\left((A \cup B)^c\right)$=

A. 17

B. 9

C. 11

D. 3

Answer: D

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193. 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 and Chemistry 18. How many students have offered Mathematics alone ?

A. 35

B. 48

C. 60

D. 22

Answer: C

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194. In a city 20 percent of the population travels by car, 50 per cent travels by bus and 10 percent travels by both car and bus. Then persons travelling by car or bus is :

A. 80 percent

B. 40 percent

C. 60 percent

D. 70 percent

Answer: C

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195. If A and B are not disjoint sets, then $n(A \cup B) =$

A. 1.$n(A) + n(B)$

B. 2.$n(A) + n(B) - n(A \cap B)$

C. 3.`n(A)+n(B)+n(A nn B)

D. $4.n(A).\ n(B)$

Answer: B

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196. In a college of 300 students , every student reads 5 newspapers and every newspaper is read by 60 students.The number of newspaper is :

A. atleast 30

B. atmost 20

C. exactly 25

D. none of these

Answer: C

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197. Two finite sets have m and n elements. The number of subsets of the first set is 112 more than that of the second set. The values of m and n are , respectively :

A. 7,6

B. 6,3

C. 6,4

D. 3,4

Answer:

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198. If $f(x) = (a - x^n)^{\frac{1}{n}}$, then $f(f(x))$=

A. 1.x

B. 2.a-x

C. 3.x^n

D. 4. $\frac{x^1}{n}$

Answer: A

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199. If $f:(R) \to (R)$ and $g(R) \to (R)$ defined by $f(x) = 2x + 3$and $g(x) = x^2 + 7$,then the values of x such that $g(f(x)) = 8$are

A. 1)1,2

B. 2)-3

C. 3)-3

D. 4)-1,-2

Answer: C

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200. If $f(x) = 2x^2 + x + 1$ and $g(x) = 3x + 1$ then $fog(2)$

A. 1)34

B. 2)33

C. 3)106

D. 4)105

Answer: C

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201. Two functions $f: R \to R$ and $g: R \to R$ are defined by $f(x) = \{(0, x\ rational)(1, x\ irrational), g(x) = \{(-1, x\ rational)(0, xi$ then $gofe + fog(\pi)$

A. a,-1

B. b.0

C. c.1

D. d.2

Answer: A

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202. If $f(x) = \left(25 - x^4\right)^{\frac{1}{4}} f \text{ or } 0 < x < \sqrt{5})$, then

f(f((1)/(2)))`=

A. 2^{-4}

B. 2^{-3}

C. 2^{-2}

D. 2^{-1}

Answer: D

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

A. a)1

B. b)2

C. c)3

D. d)4

Answer: C

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204. If f(x)=$\dfrac{2x+1}{3x-2}$, then $fof(2)$ is equal to

A. 1)1

B. 2)3

C. 3)4

D. 4)2

Answer: D

Watch Video Solution

205. $If the functions f, g, h are def \in edomthesetsofrealvmbers$R to R $sucht\hat{}$

f(x)=x^(2)-1 g(x)=sqrt(x^(2)+1), h(x) = {(0, if le 0),(if x ge 0):} $thenthecompositionfunction(hofog)(x) =$

A. {(0, x=0),(x^2, xgt0),(-x^2, xlt0):}

B. {((0, x=0),(x^2,xne0):}

C. {(0, xle0),(x^2,xge0):}

D. none of these

Answer: B

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206. If $f:(R) \to (R)$ and $g(R) \to (R)$ defined by $f(x) = 2x + 3$and $g(x) = x^2 + 7$,then the values of x such that $g(f(x)) = 8$are

A. ± 1

B. ± 1

C. ± 3

D. ± 4

Answer: B

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207. 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.

C. f(x)

D. g(x)

Answer: B

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208. If $g(f(x)) = |\sin x|$ and $f(g(x)) = \left(\sin\sqrt{x}\right)^2$ then

A. $f(x) = \sin^2 x, g(x) = \sqrt{x}$

B. $f(x) = \sin x, g(x) = |x|$

C. $f(x) = x^2, g(x) = \sin\sqrt{x}$

D. f and g cannot be determined

Answer: A

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209. Prove that $\cos^2 x + \cos^2\left(x + \frac{\pi}{3}\right) + \cos^2\left(x - \frac{\pi}{3}\right) = \frac{3}{2}$.

A. 0

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

C. 1

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

Answer: B

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210. 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

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

A. x^2

B. x^2-1

C. x^2-2

D. x^2+1

Answer: C

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212. If $f(x)=\frac{1}{\sqrt{x+2\sqrt{2x-4}}}+\frac{1}{\sqrt{x-2\sqrt{2x-4}}}$, for $x>2$, then f(11)=`

A. $\frac{7}{6}$

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

C. $\frac{6}{7}$

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

Answer: C

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213. Let $X=\{1,2,3,4\}$, then one-one onto mappings $f: X \to X$ such that $f(1)=1, f(2) \neq 2$ and $f(4) \neq 4$ are given by :

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

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

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

D. none of these

Answer: A

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214. Let, $f: R \to R$ be given by $f(x) = (x+1)^2 - 1, x \geq -1$. Then the set of values of x for which $f(x) = f^{-1}(x)$ is given by

A. 1){0}

B. 2){0,-1}

C. 3){-1}

D. 4)none of these

Answer: B

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215. Let $f: R \to R$ be given by $f(x) = (x+1)^2 - 1, x \geq -1$. Then $f^{-1}(x) =$

A. $-1 + \sqrt{x+1}$

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

C. does not exist as f is not one-one

D. does not exist as f is not onto

Answer: A

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216. Suppose $f(x) = (x+1)^2$ for $x \geq -1$. If g(x) is the function whose graph is reflection of the graph of f(x) with respect to the line$y = x$, then g(x) equals :

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

B. $\frac{1}{(x+1)^2}, x > -1$

C. $\sqrt{x+1}, x \geq -1$

D. $\sqrt{x}-1, x \geq 0$

Answer: D

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217. Let $f: R \to R$ be defined by $f(x) = 2x + |x|$ then $f(2x) + f(-x) - f(x) =$

A. a. 2x

B. b. $2|x|$

C. c. -2 x

D. d. $-2|x|$

Answer: B

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218. If $f:[1,\infty)\to[1,\infty)$ is given by $f(x)=x+\frac{1}{x}$, then $f^{-1}(x)$ equals :

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

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

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

D. not defined

Answer: B

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219. If $f:[1,\infty)\to[2,\infty)$ is given by $f(x)=x+\frac{1}{x}$, then $f^{-1}(x)$ equals :

A. $\frac{x+\sqrt{x^2-4}}{2}$

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

C. $\frac{x-\sqrt{x^2-4}}{2}$

D. $1 + \sqrt{x^2 - 4}$

Answer: A

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220. Let $f(\theta) = \sin\theta(\sin\theta + \sin 3\theta)$ then $f(\theta)$:

A. ≥ 0 only when $\theta \geq 0$

B. ≤ 0 for all θ

C. ≥ 0 for all real θ

D. ≤ 0 only when $\theta \leq 0$

Answer: C

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221. If $f(x) = 3x - 5$, then $f^{-1}(x) =$

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

B. b. $\frac{x+5}{3}$

C. c.does.not exist because f is not one-one

D. d. does not exist because f is not onto

Answer: B

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222. If $f(1)=1$ and $f(n+1)=2f(n)+1$, then $f(n)$ is

A. A.2^{n+1}

B. B.2^n

C. C.2^n-1

D. D.$2^{n-1}-1$

Answer: C

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223. If $f(x) = \alpha x^2 + bx + c$, then the values of a and b for which the identity $f(x+1) - f(x) = 8x + 3$ is satisfied are

A. 1.a=1 b=4

B. 2.a=1 b=-4

C. 3.a=4 b=1

D. 4.a=4 b=-1

Answer: D

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224. If $f(x) = 1 + \alpha x, \alpha \neq 0$ is the inverse of itself, then the value of α is :

A. -2

B. -1

C. 0

D. 2

Answer: B

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225. Let $f:[0.1] \to [0,1]$ and $g:[0,1] \to [0,1]$ be two functions defined by $f(x) = \dfrac{1-x}{1+x}$ and $g(x) = 4x(1-x)$, then $f.\,og(x) =$

A. a. $\dfrac{8x(1-x)}{(1+x)^2}$

B. b. $\dfrac{4(1-x)}{1+x}$

C. c. $\dfrac{1-4x+4x^2}{1+4x-4x^2}$

D. d. $no \neq ofthese$

Answer: C

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226. 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

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227. If $f(x) = \sin^{-1}\left(\log_2\left(\frac{x^2}{2}\right)\right)$, then thedomain of the function is`

A. a.$[-2, -1] \cup [1, 2]$

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

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

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

Answer: A

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228. The domain of the function

$y = \sqrt{x-2} + \sqrt{1-x}$ is

A. $[1, \infty)$

B. $(-\infty, 6)$

C. $[1, 6]$

D. $(-\infty, 6]$

Answer: C

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229. The domain of the function $f(x) = \frac{1}{\sqrt{|x| - x}}$ is :

A. $[0, \infty)$

B. $(-\infty, 0)$

C. $(-\infty, 0]$

D. $[1, \infty)$

Answer: B

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230. The domain of the function : $f(x) = \log_2[\log_3[\log_4 x]]$ is :

A. $x < 4$

B. $x > 4$

C. $0 < x < 2$

D. $2 < x < 4$

Answer: B

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231. The domain of the function $f(x) = \sqrt{\log_{0.5} x}$ is :

A. $(0, 1]$

B. $(0, \infty)$

C. $(0.5, \infty)$

D. $[1, \infty)$

Answer: A

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232. The domain of the function $f(x) = \sqrt{\log_{0.5} x}$ is :

A. $x \geq 0$

B. $|x| \geq 1$

C. $|x| \leq 1$

D. $|x| \geq 4$

Answer: B

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233. The domain of the definition of the function y(x) given by the equation $2^x + 2^y = 2$ is :

A. $0 < x < 1$

B. $0 \leq x_n \leq 1$

C. $-\infty < x < 0$

D. $-\infty < x < 1$

Answer: D

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234. The domain of definition of $f(x) = \frac{\log_2(x+3)}{x^2+3x+2}$ is :

A. $R - (-1, -2)$

B. $(-2, \infty)$

C. $R - (-1, -2, -3)$

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

Answer: D

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235. Range of the function $f(x) = \frac{x^2+x+2}{x^2+x+1}, x \in R$ is :

A. $R - \left(-\frac{1}{2}, 1\right)$

B. R

C. $R - (1)$

D. none of these

Answer: A

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236. Domain of $\sin^{-1}\left(\frac{2x+1}{3}\right)$ is

A. 1)(-2,1)

B. 2)[-2,1]

C. 3)R

D. 4)[-1,1]

Answer: B

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237. Range of the function $f(x) = \frac{x^2+x+2}{x^2+x+1}, x \in R$ is :

A. (3,5)

B. [1,3]

C. $\left[1, \frac{7}{5}\right]$

D. $\left(1, \frac{7}{3}\right]$

Answer: D

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238. The natural domain of the function $\sqrt{\sin^{-1}(2x) + \frac{\pi}{6}}, x \in R$ is :

A. $\left[-(1)(4), \frac{1}{2}\right]$

B. $\left[-(1)(4), \frac{1}{4}\right]$

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

D. $\left[-(1)(2), \frac{1}{4}\right]$

Answer: A

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239. Domain of definition of the function : $f(x) = \frac{3}{4 - x^2} + \log_{10}(x^3 - x)$ is :

A. $(-1, 0) \cup (1, 2) \cup (2, \infty)$

B. $(1, 2)$

C. $(-1, 0) \cup (1, 2)$

D. $(1, 2) \cup (2, \infty)$

Answer: A

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240. The range of the function : $f(x) = {}^{7-x}P_{x-3}$ is :

A. (1,2,3,4)

B. (1,2,3,4,5,6)

C. (1,2,3)

D. (1,2,3,4)

Answer: C

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241. The domain of the function : $f(x) = \frac{\sin^{-1}(x-3)}{\sqrt{9-x^2}}$ is :

A. (1,2)

B. [2,3]

C. [2,3]

D. [1,2]

Answer: B

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242. Which of the following functions is an even function :

A. $f(x) = \frac{a^x + a^{-x}}{a^x - a^{-x}}$

B. $f(x) = \dfrac{a^x + 1}{a^x - 1}$

C. $f(x) = x\left(\dfrac{a^x - 1}{a^x + 1}\right)$

D. $f(x) = \log_2\left(x + \sqrt{x^2 + 1}\right)$

Answer: C

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243. If the real valued function $f(x) = \dfrac{a^x - 1}{x^n(a^x + 1)}$ is even then n equals

A. 2

B. $\dfrac{2}{3}$

C. $\dfrac{1}{4}$

D. $-\dfrac{1}{3}$

Answer: D

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244. If f(x) is an odd periodic function with period 2 then f(4)=

A. 0

B. 2

C. 4

D. -4

Answer: A

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245. The function $f: X \to Y$ defined by $f(x) = \sin x$ is one-one but not onto, if X and Y are respectively equal to

A. 1) $[0, \pi]$ and $[0, 1]$

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

C. 3) $\left[0, \frac{\pi}{2}\right]$ and $[-1, 1]$

D. 4) R and R

Answer: C

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246. Let the function $g:(-\infty,\infty)\to\left(-\frac{\pi}{2},\frac{\pi}{2}\right)$ be given by $g(u)=2\tan^{-1}(e^u)-\frac{\pi}{2}$. Then g is :

A. 1: onto but not one-one

B. 2: one-one but not onto

C. 3: one-one and onto

D. 4:neither one-one nor onto

Answer: C

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247. Let X and Y be subsets of R, the set of all real numbers. The function

$f:X\to Y,$

defined by $f(x) = x^2 f$ or $x \in X$, is one-one but not onto if (HereR^+ is the set of all +ve real numbers)

A. $X = Y = R^+$

B. $X = R, Y = R^+$

C. $X = R^+, Y = R$

D. $X = Y = R$

Answer: C

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248. Function $f: R \to R$, defined by $f(x) = x^2 + x$ is

A. one-one, onto

B. one-one, into

C. many one, onto

D. many one, into

Answer: D

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249. Which one of the following is the bijective function on the set of real numbers

A. 1)2 x-5

B. 2)[x]

C. 3)x^2

D. 4)$x^2 + 1$

Answer: A

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250. Which of the following functions is not periodic ?

A. $|\sin 3x| + \sin^2 x$

B. $\cos \sqrt{x} + \cos^2 x$

C. $\cos 4x + \tan^2 x$

D. $\cos 2x + \sin x$

Answer: B

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

A. 1)f(x) is even

B. 2)$f(x_1).\ f(x_2) = f(x_1 + x_2)$

C. 3)$\frac{f(x_1)}{f(x_2)} = f(x_1 + x_2)$

D. 4)$f(x) is odd$

Answer: D

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252. Let function $f: R \to R$ be defined by $f(x) = 2x + \sin x$ for $x \in R$.

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: A

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253. A function $f: [0, \infty) \to [0, \infty)$ defined as $f(x) = \frac{x}{1+x}$ 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

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254. The function $f(x) = \log\left(x + \sqrt{x^2 + 1}\right)$ is :

A. neither an even nor an odd function

B. an even function

C. an odd function

D. a periodic function

Answer: C

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255. A function f from the set of natural numbers to integers defined by :

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

A. neither one-one nor onto

B. one-one but not onto

C. onto but not one-one

D. both one-one and onto

Answer: D

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256. Let R be the set of all real numbers. A relation R has been defined on R by aRb $\Leftrightarrow |a-b| \leq 1$, then R is

A. reflexive and symmetric

B. symmetric only

C. transitive only

D. anti symmetric

Answer: A

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

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

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

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

D. $f^{-1}(x)$ does not exist(

Answer: D

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258. A set A has 5 element. Then the maximum number of relations on A (including empty relation) is

A. 5

B. 2^5

C. 2^{25}

D. 25

Answer: C

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259. If $f: R \to R$ is defined by $f(x) = x^3$ then $f^{-1}(8) =$

A. $(2, 2w, 2w^2)$

B. (2)

C. (2,2)

D. (2,-2)

Answer: C

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260. R is a relation on N given by $R = \{(x, y) \mid 4x + 3y = 20\}$. Which of the following belongs to R?

A. $(5, 0)$

B. $(-4, 12)c(2, 4)$

C. $(2, 4)$

D. $(3, 4)$

Answer: C

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261. On the set Z of all integers define $f: Z - (0) \to Z$ as follows

$f(n) = \begin{cases} \frac{n}{2} & n\ is\ even \\ \frac{2}{0} & n\ is\ odd \end{cases}$ then f is

A. surjective but not injective

B. bijective

C. injective but not surjective

D. neither injective nor surjective

Answer: A

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262. Define a relation R on A ={1,2,3,4} as xRy iff x divides y. Then R is :

A. Reflexive and transitive

B. Reflexive and symmetric

C. Symmetric and transitive

D. Equivalence

Answer: A

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263. Let R be an equivalence relation defined on a set containing 6 elements. The minimum number of ordered pairs that R should contain is

A. 36

B. 64

C. 6

D. 12

Answer: C

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264. The range of the function $f(x) = \sin[x], -\frac{x}{4} < x < \frac{x}{4}$ where [x] denotes the greatest integer $\leq x$, is

A. 0

B. (0,-1)

C. $(0, \pm \sin 1)$

D. $(0, -\sin 1)$

Answer: D

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265. The value of $\alpha(\neq 0)$ for which the function $f(x) = 1 + \alpha x$ is the inverse of itself is :

A. -2

B. 2

C. -1

D. 1

Answer: C

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266. The number of one-one and onto mapping from A to B, where $n(A) = 6$ and $n(B) = 7$ is :

A. 1000

B. 42

C. 13

D. 0

Answer: D

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267. If $f(x) = \frac{3x + 2}{5x - 3}$, then :

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

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

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

D. $f^{-1}(x) = \frac{1}{19}f(x)$

Answer: A

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268. 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. [0,1]

B. [-1,1]

C. [0,3]

D. [-1,3]

Answer: D

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269. Let $f: (-1, 1) \to B$ be a function defined by : $f(x) = \tan^{-1} \frac{2x}{1 - x^2}$,

then f is both one-one and onto when B is the interval :

A. $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

B. $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right)$

C. $\left[0, \frac{\dot{\pi}}{2}\right)$

D. $\left(0, \frac{\pi}{2}\right)$

Answer: A

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270. If A ,B and C be three sets such that A $\cup$ B = A $\cup$ C and $A \cap B = A \cap C$, then :

A. $A = B$

B. $B = C$

C. $A = C$

D. $A = B = C$

Answer: B

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271. For real x, let $f(x) = x^3 + 5x + 1,$, then :

A. f is neither one-one nor onto on R

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

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

D. f is one-one and onto on $boldsymbol(R)$

Answer: D

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272. The domain of the function $f(x) = \frac{1}{\sqrt{|x| - x}}$ is :

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

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

C. $(0, \infty)$

D. $(-\infty, 0)$

Answer: D

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273. 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

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274. Let $f(x) = \frac{\alpha x}{x+1}, x \neq 0$, then for what value of α is $f[f(x)] = x$?

A. $\sqrt{2}$

B. $-\sqrt{2}$

C. 1

D. -1

Answer: D

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275. Suppose $f(x) = (x+1)^2$ for $x \geq -1$. If g(x) is the function whose graph is reflection of the graph of f(x) with respect to the line$y = x$, then g(x) equals :

A. $-\sqrt{x} - 1, x \geq 0$

B. $\frac{1}{(x+1)^2}, x > -1$

C. $\sqrt{x+1}, x \geq -1$

D. $\sqrt{x}-1, x \geq 0$

Answer: D

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276. If

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

then $f-g$ is

A. 1)one-one and into

B. 2)neither one-one nor onto

C. 3)many one and onto

D. 4)one-one and onto

Answer: D

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277. Let, $f:(0,1) \to R$ be defined by

$f(x) = \frac{b-x}{1-bx}$where b is a constant such that $0 < b < 1$. Then,

A. f is not invertible on (0,1)

B. $f \neq f^{-1} on(0,1)$ and $f'(b) = \frac{1}{f'(0)}$

C. $f = f^{-1} on(0,1)$ and $f'(b) = \frac{1}{f'(0)}$

D. $f^{-1} isd \Leftrightarrow erentiab \leq on(0,1)$

Answer: A

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278. Which of the following is $(A-B) \cup (B-A)$

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

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

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

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

Answer: C

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279. If A and B are any two sets then $A \cap (A \cup B)'$ =

A. X

B. Y

C. ϕ

D. $X \cup Y$

Answer: C

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280. Let $f: N \to N$ be defined by $f(x) = x^2 + x + 1$ then f is

A. one-one, onto

B. many one onto

C. one-one but not onto

D. onto but not one-one

Answer: C

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281. The image of the interval [-1,3] under the mapping $f: R \to R$ given by $f(x) = 4x^3 - 12$ x is

A. $[8, 72]$

B. $[0, 72]$

C. $[-8, 72]$

D. $[0, 8]$

Answer: C

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282. The number of functions that can be formed from the set $A = \{a, b, c, d\}$ into the set $B = \{1, 2, 3\}$ is equal to`

A. 12

B. 24

C. 64

D. 81

Answer: D

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283. Let R= { (3, 3), (6, 6), (9, 9), (12, 12), (6, 12), (3,9), (3, 12), (3,6)} be a relation on the set A= { 3,6,9,12}.

The relation is :

A. reflexive and symmetric

B. an equivalence relation

C. reflexive only

D. reflexive and transitive only

Answer: D

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284. Let $Y = \{1, 2, 3, 4, 5\}, A = \{1, 2\}, B = \{3, 4, 5\}$ and ϕ denotes the null set. If $A \times B$ denotes the Cartesian product of sets A and B then $(Y \times A) \cap (Y \times B)$ is

A. Y

B. A

C. B

D. ϕ

Answer: D

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285. Let $A = \{2, 3, 4, 5, . . , 17, 18\}$. $Let \sim$ ' be the equivalence relation on A x A, cartesian product of A with itself defined by (a.b)~(c.d),iff ad=bc then the number of ordered pairs of the equivalence class of (3,2) is

A. a)4

B. b)5

C. c)6

D. d)7

Answer: A

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