RAVI MATHS TUITION CENTER, CHENNAI-82. WHATSAPP - 8056206308

Relations And Functions

12th Standard

Maths

Exam Time : 01:00:00 Hrs

Total Marks : 60

52 x 1 = 52

1) Let R be the relation in the set {1, 2, 3, 4} given by R = {(1, 2), (2, 2), (1, 1), (4,4), (1, 3), (3, 3), (3, 2)}. Choose the correct answer

(a) R is reflexive and symmetric but not transitive (b) R is reflexive and transitive but not symmetric

(c) R is symmetric and transitive but not reflexive. (d) R is an equivalence relation.

2) Let R be the relation in the set N given by R = {(a, b) : a = b − 2, b > 6}. Choose the correct answer

(a) (2, 4)∈ R (b) (3, 8) ∈ R (c) (6, 8)∈ R (d) (8, 7) ∈ R

3) Let f : R ⟶ R be defined as f(x) = x^4. Choose the correct answer

(a) f is one-one onto (b) f is many-one onto (c) f is one-one but not onto (d) f is neither one-one nor onto

4) Let f : R → R be defined as f (x) = 3x. Choose the correct answer

(a) f is one-one onto (b) f is many-one onto (c) f is one-one but not onto (d) f is neither one-one nor onto

5) If f : R ⟶ R be given by f (x) = $(3 - x^3)^{\frac{1}{3}}$, then fof (x) is

(a) $x^{\frac{1}{3}}$ (b) x^3 (c) x (d) $(3 - x^3)$.

6) Consider a binary operation * on N defined as a * b = $a^3 + b^3$. Choose the correct answer

(a) Is * both associative and commutative? (b) Is * commutative but not associative? (c) Is * associative but not commutative?

(d) Is * neither commutative nor associative?

7) Let A = {1, 2, 3}. Then number of relations containing (1, 2) and (1, 3) which are reflexive and symmetric but not transitive is

(a) 1 (b) 2 (c) 3 (d) 4

8) Let A = {1, 2, 3}. Then number of equivalence relations containing (1, 2) is

(a) 1 (b) 2 (c) 3 (d) 4

9) Number of binary operations on the set {a, b} are

(a) 10 (b) 16 (c) 20 (d) 8

10) Let R be a relation on the set L of lines defined by l_1 R l_2 if l_1 is perpendicular to l_2, then relation R is

(a) reflexive and symmetric (b) symmetric and transitive (c) equivalence relation (d) symmetric

11) Given set A ={1, 2, 3} and a relation R = {(1, 2), (2, 1)}, the relation R will be

(a) reflexive if (1, 1) is added (b) symmetric if (2, 3) is added (c) transitive if (1, 1) is added (d) symmetric if (3, 2) is added

12) Given triangles with sides T_1 : 3, 4, 5; T_2 : 5, 12, 13; T_3 : 6, 8, 10; T_4 : 4, 7, 9 and a relation R in set of triangles defined as R = {(Δ_1, Δ_2) : Δ_1 is similar to Δ_2}. Which triangles belong to the same equivalence class?

(a) T_1 and T_2 (b) T_2 and T_3 (c) T_1 and T_3 (d) T_1 and T_4

13) Given set A = {a, b, c). An identity relation in set A is

(a) R = {(a, b), (a, c)} (b) R = {(a, a), (b, b), (c, c)} (c) R = {(a, a), (b, b), (c, c), (a, c)} (d) R= {(c, a), (b, a), (a, a)}

14) A relation S in the set of real numbers is defined as xSy ⇒ x − y+ $\sqrt{3}$ is an irrational number, then relation S is

(a) reflexive (b) reflexive and symmetric (c) transitive (d) symmetric and transitive

15) Set A has 3 elements and the set B has 4 elements. Then the number of injective functions that can be defined from set A to set B is

(a) 144 (b) 12 (c) 24 (d) 64

16) Given a function If as f(x) = 5x + 4, x ∈ R. If g : R → R is inverse of function 'f then

(a) g(x) = 4x + 5 (b) g(x) = $\frac{5}{4x-5}$ (c) g(x) = $\frac{x-4}{5}$ (d) g(x) = 5x − 4

17) Let A = {a, b }. Then number of one-one functions from A to A possible are

(a) 2 (b) 4 (c) 1 (d) 3

18) Let R = { (P,Q) : OP = OQ , O being the origin} be an equivalence relation on A . The equivalence class [(1,2)] is

(a) {(x, y): $x^2 + y^2 = 5$} (b) {(x, y): $x^2 = y^2$} (c) {(x, y): $x^2 + y^2 = 1$} (d) {(x, y): $x^2 + y^2 = 4$}

19) Let a relation T on the set R of real numbers be T = { (a,b) : 1 + ab < 0, a,∈R}. Then from among the ordered pairs (1,1) (1,2)(1,-2)(2,2), the only pair that belongs to T is_____.

(a) **(2,2)** (b) **(1,1)** (c) (1,-2) (d) (1,2)

20) For real number x and y, we write xRy ⇔ x - y + $\sqrt{2}$ irrational number. Then the relation R is

(a) Reflexive (b) Symmetric (c) Transitive (d) Equivalence

21) Let A = {1, 2, 3, 4} and let R = {(2, 2), (3, 3), (4, 4), (1, 2)} be a relation on A. Then, R is

(a) Symmetric (b) Transitive (c) Reflexive (d) Equivalence relation

22) If A = {1,3,5,7} and we define a relation R = {(a,b), a,b ∈ A:|a - b| = 8} Then the number of elements in the relation R is

(a) 2 (b) 1 (c) 3 (d) 0

23) If A = {1,3,5,7} and define a relation, such that R = { (a,b) a,b ∈ A : |a+b| = 8}. Then how many elements are there in the relation R

(a) 8 (b) 16 (c) 1 (d) 4

24) In the set N x N the relation R is defined by (a, b) R (c, d) ⇔ ad = bc. Then R is

(a) symmetric and transitive but not reflexive (b) reflexive and transitive but not symmetric (c) Equivalence relation (d) Partial order relation

25) If A = {1, 2, 3, 4} and B = {1, 3, 5} and R is a relation from A to B defined by (a, b) ∈ element of R ⇔ a < b. Then, R = ?

(a) {(2, 3), (4, 5), (1, 3), (2, 5)} (b) {(1, 3), (1, 5), (2, 3), (2, 5), (3, 5), (4, 5)} (c) {(2, 3), (4, 5), (1, 3), (2, 5), (5, 3)} (d) {(5, 3), (3, 5), (5, 4), (4, 5)}

26) Let R be the relation on the set {1, 2, 3, 4} given by R = {(1, 2), (2, 2), (1, 1), (4, 4), (1, 3), (3,3), (3,2)}. then R is

(a) R is reflexive and symmetric but not transitive. (b) R is symmetric and transitive but not reflexive. (c) R is an equivalence relation.

(d) R is reflexive and transitive but not symmetric

27) Let A = {1,2,3,4,5,6,7}. P={1,2}, Q = {3, 7}. Write the elements of the set R so that P, Q and R form a partition that results in equivalence relation

(a) {4,5,6} (b) {0} (c) {1,2,3,4,5,6,7} (d) { }

28) Let R be a relation on set A of triangles in a plane. R = { (T_1 , T_2) : T_1, T_2 element of A and T_1 is congruent to T_2} Then the relation R is _____

(a) Equivalence relation (b) Transitive (c) Symmetric (d) Reflexive

29) Let C = {(a, b): $a^2 + b^2 = 1$; a, b ∈ R} a relation on R, set of real numbers. Then C is

(a) Equivalence relation (b) Reflexive (c) Transitive (d) Symmetric

30) Let A = {1,2,3,4} and B = {x,y,z}. Then R = {(1,x) , (2,z), (1,y), (3,x)} is

(a) relation from B to A (b) Is not a relation (c) relation from A to B (d) relation from B to B

31) Let R be a relation on N, set of natural numbers such that m R n ⇔ m divides n. Then R is

(a) Reflexive and symmetric (b) Neither reflexive nor transitive (c) Reflexive and transitive (d) Symmetric and transitive

32) If R be a relation "less than" from set A = {1, 2, 3, 4} to B = {1, 3, 5}, i.e. (a, b) ∈ R if a < b, if (b,a) ∈ R^{-1}elements in R^{-1} are

(a) {(3, 3), (3, 5), (5, 3), (5, 5)} (b) {(3, 1), (5, 1), (3, 2), (5, 2), (5, 3), (5, 4)} (c) {(3, 3), (3, 4), (4, 5)} (d) {(1, 3), (1, 5), (2, 3), (2, 5), (3, 5), (4, 5)}

33) Let R be a relation on a finite set A having n elements. Then, the number of relations on A is

(a) n x n (b) 2^n (c) n^2 (d) 2^{nxn}

34) Let R be a relation on N (set of natural numbers) such that (m, n) R (p, q)mq(n + p) = np(m + q). Then, R is

(a) An Equivalence Relation (b) Only Reflexive (c) Symmetric and reflexive (d) Only Transitive

35) 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}. Then, R is

(a) Symmetric only (b) An equivalence relation (c) Reflexive and symmetric only (d) Reflexive and transitive only

36) Let R be an equivalence relation on Z, the set of integers. R = { (a,b): a,b ∈ Z and a − b is a multiple of 3 } The Equivalence class of [1] is

(a) {..-7,-4,2,5,8,.} (b) {.-4,-1,2,5,8,.} (c) {.-4,-1,2,5,8,.} (d) {.....-5,-2,1,4,7,.}

37) A relation f from C to R is defined by $xfy \Leftrightarrow |x| = y$.Then, the correct option is

(a) (2+i)f3 (b) 3f(-3) (c) i f 1 (d) (2 +3i) f 13

38) 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

39) The relation R in the set of natural numbers N defined as R = {(x, y) : y = x + 5 and x < 4} is

(a) reflexive (b) symmetric (c) transitive (d) None of these

40) For the set A = {1, 2, 3}, define a relation R in the set A as follows
R = {(1, 1), (2,2), (3, 3), (1, 3)}
Then, the ordered pair to be added to R to make it the smallest equivalence relation is

(a) (1, 3) (b) (3, 1) (c) (2, 1) (d) (1, 2)

41) If A = {x ∈ Z : 0 ≤ x ≤ 12}and R is the relation in A given by R = {(a, b): a = b}. Then, the set of all elements related to 1 is

(a) {1, 2} (b) {2, 3} (c) {1} (d) {2}

42) f : X⟶Y is onto, if and only if

(a) range of f = Y (b) range of f ≠ Y (c) range of f < Y (d) range of f ≥Y

43) The number of all one-one functions from set A = {1, 2, 3} to itself is

(a) 2 (b) 6 (c) 3 (d) 1

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

(a) ${}^nP_2$ (b) 2^n-2 (c) 2^n -1 (d) None of these

45) Let A = {a, b}. Then number of one-one functions from A to A possible are

(a) 2 (b) 4 (c) 1 (d) 3

46) A binary operation a o b = a, for a, b ∈ N is

(a) commutative (b) not associative (c) commutative and associative (d) associative but not commutative

47) Let the function 'f' : N → N be defined by $f(x) = 2x + 3, \forall x \in N$. Then f'' is

(a) not onto (b) bijective function (c) many-one, into function (d) none of these

48) A relation defined in a non-empty set A, having n elements, has

(a) n relations (b) 2 relations (c) n^2 relations (d) $2n^2$ relations

49) A relation R in human beings defined as R = (a, b) : a, b ∈ human beings; a loves {b} is

(a) reflexive (b) symmetric and transitive (c) equivalence (d) neither of these

50) Let R be the relation in the set of natural numbers N defined as $R = \{(x, y) \in N \times N : 3x + y = 11\}$ Then R^{-1} is given by

(a) {0, 11), (1, 8), (2, 5), (3, 2)} (b) {(1, 8), (2, 5), (3, 2)} (c) {(11, 0), (8, 1), (5, 2), (2, 3)} (d) {(8, 1), (5, 2), (2, 3)}

51) The relation R in the set of real numbers defined as R = {(a, b) ∈ R x R : 1 + ab > 0} is

(a) reflexive and transitive (b) symmetric and transitive (c) reflexive and symmetric (d) equivalence 'relation

52) Let Z be the set of integers. Define a binary operation * in Z x Z as (a, b) * (c, d) = (a + c, b +d), then binary operation * is

(a) not commutative (b) not associative (c) commutative and associative (d) does not have identity element

8 x 1 = 8

53) Let Z be the set of integers and R be a relation defined in Z such that aRb if (a b) is divisible by 5. Then R partitions the set Z into _____ pairwise disjoint subsets.

54) Let R be a relation defined as R = {(x, x), (y, y), (z, z), (x,z)} in set A = {x, y, z} then R is _____ (reflexive/symmetric) relation.

55) Consider the set A containing n elements, then the total number of injective functions from set A onto itself is _____

56) The domain of the function f: R $\rightarrow$ R defined by $f(x) = \sqrt{4 - x^2}$ is _____

57) Let A = {l, 2, 3, 4} and B = {a, b, c}, Then number of one-one functions from A to B are _____

58) If n(A) = p, then number of bijective functions from set A to A are_____

59) The identity element for the binary operation * defined on $Q - \{0\}$ as $a * b = \frac{ab}{3}, \forall a, b \in Q - \{0\}$ is _____

60) Given a set A = Q - {-1} and a binary operation *, defined as a * b = a + b + ab for a, b $\in$ A, then identity element for operation * is_____

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