



SmartSteps Academy

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Relations

DPP 2

- Let R be the relation in the set $\{1, 2, 3, 4\}$ given by $R = \{(1, 2), (2, 2), (1, 1), (4, 4), (1, 3), (3, 3), (3, 2)\}$. Then
 - R is reflexive and symmetric but not transitive
 - R is reflexive and transitive but not symmetric
 - R is symmetric and transitive but not reflexive
 - R is an equivalence relation
- Let R be the relation in the set \mathbb{N} given by $R = \{(a, b); a = b - 2, b > 6\}$. Choose the correct answer.
 - $(2, 4) \in R$
 - $(3, 8) \in R$
 - $(6, 8) \in R$
 - $(8, 7) \in R$
- If $A = \{a, b, c\}$ and $R = \{(a, a), (a, b), (a, c), (b, c)\}$ be a relation on A , then R is
 - Reflexive
 - Transitive
 - Symmetric
 - None of these
- If P and Q are two relations on a set A , then which of the following is **not** correct?
 - If P and Q are symmetric, then $P \cup Q$ is also symmetric
 - If P and Q are reflexive, then $P \cap Q$ is also reflexive
 - If P and Q are transitive, then $P \cap Q$ is also transitive
 - If P and Q are transitive, then $P \cup Q$ is also transitive
- Let n be a fixed positive integer. Let a relation R be defined on \mathbb{Z} (the set of all integers) as follows: aRb iff $(a - b)$ is divisible by n . Then, the relation R is
 - Reflexive only
 - Symmetric only
 - Transitive only
 - An equivalence relation
- If R and R' are symmetric relations (not disjoint) on a set A , then the relation $R \circ R'$ is
 - Reflexive
 - Symmetric
 - Transitive
 - None of these
- Assume R and S (non-empty) relations in a set A . Which of the relations given below is false?
 - If R and S are transitive, then $R \cup S$ is transitive

- B. If R and S are transitive, then $R \circ S$ is transitive
- C. If R and S are symmetric, then $R \cup S$ is symmetric
- D. If R and S are symmetric, then $R \circ S$ is symmetric
8. n, m means that n is a factor of m , then the relation ' $'$ ' is
- A. Reflexive and Symmetric
- B. Transitive and Reflexive
- C. Reflexive, Transitive and Symmetric
- D. Not reflexive, transitive and not symmetric
9. In the set $A = \{2, 3, 4, 5\}$, a relation R is defined by $R = \{(x, y) \mid x, y \in A \text{ and } x - y \in \mathbb{Z}\}$. Then R is
- A. Reflexive
- B. Symmetric
- C. Transitive
- D. None of these
10. Let $A = \{p, q, r\}$. Which of the following is an equivalence relation on A ?
- A. $R_1 = \{(p, p), (q, q), (r, r), (p, r)\}$
- B. $R_2 = \{(p, p), (q, q), (r, r), (p, q)\}$
- C. $R_3 = \{(p, p), (q, q), (r, r), (p, q), (q, p)\}$
- D. None of these
11. Let R be the relation in the set $\{1, 2, 3, 4\}$ given by $R = \{(1, 2), (2, 2), (1, 1), (4, 4), (1, 3), (3, 3), (3, 2)\}$. Then
- 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
12. A relation R is defined from $\mathbb{N} \rightarrow \mathbb{N}$ and aRb if and only if $a = b$. Then R is
- A. Reflexive only
- B. Symmetric only
- C. Equivalence relation
- D. Antisymmetric
13. Let a relation be defined by $R = \{(a, b) : 2a = 6b, a, b \in \mathbb{R}\}$. Then the relation R is
- A. Reflexive, symmetric and transitive
- B. Reflexive, not symmetric and not transitive
- C. Symmetric, but not reflexive or transitive
- D. Reflexive and symmetric but not transitive
14. Consider a relation R defined on set $A = \{a, b, c\}$ as $R = \{(a, a), (b, b), (c, c), (a, b), (b, c)\}$. Then R is
- A. Symmetric
- B. Reflexive
- C. Transitive
- D. Reflexive but not transitive
15. Let R be a relation given by $R = \{(a, b) : a - b \text{ is divisible by } 3, a, b \in \mathbb{Z}\}$. Then
- A. R is reflexive only
- B. R is symmetric only
- C. R is transitive only
- D. R is an equivalence relation
16. Let R be the relation on the set $A = \{1, 2, 3\}$ defined by $R = \{(1, 1), (2, 2), (3, 3), (1, 2), (2, 3)\}$. Then R is
- A. Reflexive
- B. Symmetric
- C. Transitive
- D. None of these
17. The relation "less than" in the set of all natural numbers is
- A. Only reflexive
- B. Only symmetric
- C. Only antisymmetric
- D. Reflexive and transitive

18. Let R be a relation defined by $R = \{(a, b) : a \leq b\}$ on the set $A = \{1, 2, 3, 4\}$. Then R is
- A. Reflexive, symmetric and transitive
 - B. Reflexive and transitive but not symmetric
 - C. Reflexive and symmetric but not transitive
 - D. Reflexive but neither symmetric nor transitive
19. In a 3-dimensional plane, which one of the following is an equivalence relation?
- A. Parallel lines
 - B. Intersecting lines
 - C. Skew lines
 - D. One line defined parallel to itself
20. Let $R = \{(2, 3), (6, 9), (1, 2), (3, 6), (2, 6)\}$ be a relation on set $A = \{1, 2, 3, 4\}$. Then the relation R is
- A. Reflexive and symmetric only
 - B. Reflexive and transitive only
 - C. Reflexive, symmetric and transitive
 - D. Neither reflexive, symmetric nor transitive
21. A relation is given by R such that $(a, b) \in R$ if $ab \geq 0$, then true relation is
- A. Reflexive only
 - B. Only symmetric
 - C. Only transitive
 - D. Equivalence relation
22. A relation on the set of whole numbers is defined as follows: Two whole numbers a and b are related if they leave same remainder on division by 5. This is
- A. Not an equivalence relation
 - B. An equivalence relation
 - C. A relation which is only symmetric
 - D. A relation which is only reflexive
23. The relation $R = \{(1, 1), (2, 2), (1, 2), (2, 1), (3, 3), (1, 3), (3, 1)\}$ on the set $A = \{1, 2, 3\}$ is
- A. Reflexive and symmetric but not transitive
 - B. Reflexive and transitive but not symmetric
 - C. Symmetric and transitive but not reflexive
 - D. Equivalence relation
24. Let R be the set of all real numbers. The relation $R = \{(a, b) : |a - b| \leq 2\}$ is
- A. Reflexive and symmetric but not transitive
 - B. Reflexive and transitive but not symmetric
 - C. Symmetric and transitive but not reflexive
 - D. Reflexive, symmetric and transitive
25. The relation R_0 defined on the set of real numbers as $R_0 = \{(x, y) \in \mathbb{R} \times \mathbb{R} : x^2 + y^2 = 1\}$ is
- A. Reflexive
 - B. Symmetric
 - C. Transitive
 - D. None of these
26. Let R be a relation on the set of natural numbers such that $R = \{(a, b) : \frac{a+b}{2} \in \mathbb{N}\}$, then R is
- A. Reflexive and symmetric but not transitive
 - B. Reflexive and transitive but not symmetric
 - C. Symmetric and transitive but not reflexive
 - D. Equivalence relation