Boards

PARISHRAM 2026

Mathematics

DPP: 2

Relations and Functions

Q1 Let A = {1, 2, 3} & B = {5, 7, 9} if a relation R is defined from A to B, defined as R = {(a, b) : a > b, $\mathbf{a} \in \mathbf{A}$ & b ∈ B} then R is
(A) Universal Relation
(B) Null Relation
(C) Identity Relation
(D) None of these

Q2 Let A = {–5, –2, –3} & B = {1 ,5, 7} if a relation R is defined from A to B defined by R = {(a, b) : a < b, a ∈ A & b ∈B} then R is
(A) Universal Relation
(B) Null Relation
(C) Identity Relation
(D) None of these

Q3 The void relation on a set A is
(A) Reflexive
(B) Symmetric and transitive
(C) Reflexive and symmetric
(D) Reflexive and transitive

Q4 Let R be a relation on the set N of natural numbers defined by nRm if n divides m. Then R is:
(A) Reflexive and symmetric
(B) Transitive and symmetric
(C) Equivalence
(D) Reflexive, transitive but not symmetric

Q5 For real numbers x and y, define xRy if and only if $\mathbf{x} - \mathbf{y} + \sqrt{2}$ is an irrational number. Then the relation R is:
(A) reflexive (B) symmetric
(C) transitive (D) equivalence

Q6 The relation R in the set of natural number N defined as R = {(x, y) : y = x + 5 and x < 4} is:
(A) reflexive (B) transitive
(C) symmetric (D) None of these

Q7 Let T be the set of all triangles in the Euclidean plane and let a relation R on T be defined as aRb if a is congruent to b for all a, b ∈ T, then R is:
(A) reflextive but not symmetric
(B) transitive but not symmetric
(C) equivalence
(D) neither symmetric nor transitive

Q8 If a relation R on the set {1, 2, 3} be defined by R = {(1, 2)}, then R is:
(A) reflexive (B) symmetric
(C) transitive (D) None of these

Q9 Let us define a relation R in R as aRb 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

Q10 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 Key

Q1	B
Q2	A
Q3	B
Q4	D
Q5	A
Q6	B
Q7	C
Q8	C
Q9	B
Q10	A

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

As no alement of set A is greater than the element of set B $\therefore$ R = ϕ

Video Solution:

Q2 Text Solution:

As every element of set A is less than every element of set B.

$\therefore (\mathrm{a},\ \mathrm{b}) \in \mathbf{R}$ for all $\mathbf{a} \in \mathbf{A},\ \mathbf{b} \in \mathbf{B}$. Hence, R = A × B.

Video Solution:

Q3 Text Solution:

Void relation on a set A is symmetric, transitive but not reflextive

$\because$ there is no element present in the relation.

$\therefore (\mathrm{a},\ \mathrm{a}) \notin \mathbf{R}$ for all $\mathbf{a} \in \mathbf{A}$. Hence, not reflexive.

Also, since no element belongs to R, so, relation is symmetric and transitive trivially.

As there is no counter example which can prove that void relation is neither symmetric nor transitive.

Video Solution:

Q4 Text Solution:

Since n divides n, $\forall \mathbf{n} \in \mathbf{N}, \therefore \mathbf{R}$ is reflexive. R) is not symmetric since for 3,6∈N and (3, 6)∈ $\mathbf{R}$ but (6, 3)∉ $\mathbf{R}$. R is transitive, whenever (n, m) ∈ $\mathbf{R}$ and (m, r)∈ $\mathbf{R}$⇒(n, r)∈ $\mathbf{R}$,

i.e., n divides m and m divides, r, then n will divide r also.

Video Solution:

Q5 Text Solution:

As $\mathbf{x} - \mathbf{x} + \sqrt{2} = \sqrt{2}$ is an irrational number.Thus, (x, x)∈R for all x∈R $\therefore$ R is reflexive.

Also

$(\sqrt{2}, 1) \in R$ as $\sqrt{2} - 1 + \sqrt{2} = 2\sqrt{2} - 1$ is an irrational number but

$(1,\ \sqrt{2}) \notin \mathbf{R}$ as $1 - \sqrt{2} + \sqrt{2} = 1$ is a rational number. So, R is not symmetric.

Since, $(\sqrt{2}, 2) \in R$ and $(2, 2\sqrt{2}) \in R$ but $(\sqrt{2}, 2\sqrt{2}) \notin R$. So, R is not transitive.

Video Solution:

Q6 Text Solution:

R = {(1, 6), (2, 7), (3, 8)}

$\because$ $(6,\ 6)\ \notin \mathrm{R}$

$\Rightarrow$ R is not Reflexive.

For (2, 7) $\in$R

$\Rightarrow$ (2, 7) $\in$R but (7, 2)$\notin$R

$\Rightarrow$ R is not symmetric.

Clearly, R is transitive trivially as there is no counter example by which we can prove that relation R is not transitive.

Video Solution:

Q7 Text Solution:

Each triangles is congruent to itself.

$\therefore$ Relation is reflexive.

Suppose $\Delta \mathrm{ABC} \cong \Delta \mathrm{PQR}$

then $\Delta \mathrm{PQR} \cong \Delta \mathrm{ABC}$

$\therefore$ Relation is symmetric.

Suppose $\Delta \mathrm{ABC} \cong \Delta \mathrm{PQR},$

and $\mathit{\Delta} \mathrm{PQR} \cong \Delta \mathrm{XYZ}$

then $\Delta \mathrm{ABC} \cong \mathit{\Delta}\, \mathrm{XYZ},$

$\therefore$ Relation is transitive.

$\therefore$ Relation is an equivalence relation.

Video Solution:

Q8 Text Solution:

R on the set {1, 2, 3} be defined by R = {(1, 2)}

It is clear that R is not reflexive as (1, 1)$\notin \mathbf{R}$.

R is not symmetric as (1, 2)$\in \mathbf{R}$ but (2, 1)$\notin \mathbf{R}$.

Clearly, R is transitive trivially as there is no counter example by which we can prove that relation R is not transitive.

Video Solution:

Q9 Text Solution:

Given that, aRb if a $\geq$b

As $\mathbf{a} \geq \mathbf{a}$ for all $\mathbf{a} \in \mathbf{R}$. So,

$\mathbf{aRa\ \ for\ \ all\ \ a} \in \mathbf{R}$. Hence, reflexive.

Let $\mathbf{aRb} \Rightarrow \mathbf{a} \geq \mathbf{b},\ \ \mathbf{then\ \ b\ \ \geq\ \ a}$ which is not true, so R is not symmetric.

But aRb and bRc

$\Rightarrow \mathbf{a} \geq \mathbf{b\ \ and\ \ b\ \ \geq\ \ c}$

$\Rightarrow \mathbf{a} \geq \mathbf{c}$

Hence, R is transitive.

Video Solution:

Q10 Text Solution:

Given that, A = {1, 2, 3} and R = {(1, 1), (2, 2), (3, 3), (1, 2), (2, 3), (1, 3)}

$\because$ (1, 1), (2, 2), (3, 3) $\in\ \ \mathbf{R}$

Hence, R is reflexive,

(1, 2) $\in$ R but (2, 1) $\notin$ R

Hence, R is not symmetric.

(a, b) $\in$ R and (b, c) $\in$ R

$\Rightarrow\ (\mathbf{a},\ \mathbf{c}) \in \mathbf{R}$ for all a, b, c $\in \mathbf{R}$

Hence, R is transitive.

Video Solution: