PARISHRAM 2026

Mathematics

DPP: 1

Relations and Functions

Q1 If A = {1, 2, 3} and R_1 = {(1, 2), (3, 2), (1, 3)}, R_2 = {(1, 3), (3, 6), (2, 1), (1, 2)} then:
(A) $\mathbf{R_1}$ is a relation and $\mathbf{R_2}$ is not a relation on A
(B) $\mathbf{R_1}$ and $\mathbf{R_2}$ both are relation on A
(C) $\mathbf{R_1}$ and $\mathbf{R_2}$ both are not relation on A
(D) None of these

Q2 Let R be a relation in the set N given by R = {(a, b) : a = b – 2, b > 6). Then
(A) (8, 7) R
(B) (6, 8) R
(C) (3, 8) R
(D) (2, 4) R

Q3 If R = {(x, y) : x, y ∈W, 2x + y = 5} . Then
(A) $\mathbf{R} = \{(\frac{5}{2}, 0), (2, 1), (\frac{3}{2}, 2), (\frac{1}{2}, 4), (0, 5)\}$
(B) $\mathbf{R} = \{(\frac{5}{2}, 0), (2, 1), (\frac{3}{2}, 2), (\frac{1}{2}, 4)\}$
(C) $\mathbf{R} = \{(0, 5), (1, 3), (2, 1)\}$
(D) $\mathbf{R} = \{(1, 2), (3, 1), (5, 0)\}$

Q4 The relation R defined on the set of natural numbers as {(a, b) : a differs from b by 3), is given by
(A) {(1, 4), (2, 5), (3, 6) ,.....}
(B) {(4, 1), (5, 2), (6, 3) ,.....}
(C) {(1, 3), (2, 6), (3, 9) ,.....}
(D) None of the above

Q5 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) $2^{mn} - 1$

Q6 Two finite sets A and B have m and n elements respectively. If the total number of relation from A to B is 64, then the possible values of m and n can be
(A) 1 and 5 (B) 2 and 4
(C) 2 and 3 (D) 1 and 4

Q7 If a relation R is defined on the set Z of integers as follows (a, b) ∈ R ⇔$a^2 + b^2 = 25$, then domain (R) is equal to
(A) {3, 4, 5}
(B) {0, 3, 4, 5}
(C) {0, ±3, ±4, ±5}
(D) None of these

Q8 Consider set A = {–1, 0, 1, 2, 3} and B = {1, 2, 4, 5, 0}. R = {(a, b) : b − a = 1, a ∈ A, b ∈ B}, then domain of relation R is
(A) {0, 1, 3}
(B) {–1, 0, 1, 3}
(C) {1, 2, 4, 0}
(D) {1, 2, 4, 5, 0}

Q9 Let R be a relation in N defined by R = {(1 + x, 1 + x^2) : x ≤ 5, x ∈ N}. Which of the following is false?
(A) R = {(2, 2), (3, 5), (4, 10), (5, 17) (6,25)}
(B) Domain of R = {2, 3, 4, 5, 6}
(C) Range of R = {2, 5, 10, 17, 26}
(D) None of these

Q10 Let A be the set of first ten natural numbers and let R be a relation on A defined by (x, y) ∈ R ⇔x + 2y = 10, i.e., R = {(x, y) : x ∈ A, y ∈ A and x + 2y = 10}. Then the domain and range of R is
(A) {2, 4, 6, 8}, {4, 3, 2, 1} respectively
(B) {4, 3, 2, 1}, {2, 4, 6, 8} respectively
(C) {1, 2, 3, 4}, {1, 2, 3, 4} respectively
(D) None of these

Answer Key

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

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

$A \times A =$
$\{(1,1),(1,2),(1,3),(2,1),(2,2),(2,3),$
$(3,1),(3,2),(3,3)\}$

$\because R_1 \subset A \times A \therefore R_1$ is a relation on A.

As (3, 6) $\in R_2$ but $6 \notin A \therefore R_2 \not\subset A \times A$

$\therefore R_2$ is a relation on A.

Video Solution:

Q2 Text Solution:

Given, R = {(a, b) : a = b – 2, b > 6}

Since, b > 6, so (2, 4) $\notin$ R

Also, (3, 8) $\notin$R as 3 ≠ 8 – 2

and (8, 7) $\notin$R as 8 ≠ 7 – 2

Now, for (6, 8), we have

8 > 6 and 6 = 8 – 2, which is true

$\therefore$(6,8) R

Video Solution:

Q3 Text Solution:

For x = 0, 2 × 0 + y = 5 $\Rightarrow$ y = 5 $\in$ W

For x = 1, 2 × 1 + y = 5 $\Rightarrow$ y = 3 $\in$ W

For x = 2, 2 × 2 + y = 5 $\Rightarrow$ y = 1 $\in$ W

For x = 3, 3 × 2 + y = 5 $\Rightarrow$ y = –1 $\notin$ W

We stop have as for x > 3, y is not a whole number

$\therefore R = \{(0, 5), (1, 3), (2, 1)\}$

Video Solution:

Q4 Text Solution:

Given, R = {(a, b) : a – b = 3} = {(4,1), (5, 2), (6, 3),...}

Video Solution:

Q5 Text Solution:

Given, n(A) = m and n(B) = n

$\therefore$ Total number of relations from A to B = 2^{mn}

$\therefore$Total number of non-empty relations from A to B = $2^{mn} - 1$

Video Solution:

Q6 Text Solution:

Clearly, n(A × B) = n(A) × n(B) = mn

$\therefore$ Total number of relation from A to B = 2^{mn}

Thus, we have $2^{mn} = 64 = 2^6$

$\Rightarrow$ mn = 6

Hence, possible value of m and n are 2 and 3, respectively.

Video Solution:

Q7 **Text Solution:**

We have, $(a,\ b)\in R \Leftrightarrow a^2+b^2=25$

$\Rightarrow b=\pm\sqrt{25-a^2}$

Clearly, $a=0 \Rightarrow b=\pm 5$

$a=\pm 3 \Rightarrow b=\pm 4$

$a=\pm 4 \Rightarrow b=\pm 3$

and $a=\pm 5 \Rightarrow b=0$

Hence, domain $(R)=\{0,\ \pm 3,\ \pm 4,\ \pm 5\}$.

Video Solution:

Q8 **Text Solution:**

For $a=-1,\ b-(-1)=1 \Rightarrow b=0 \in B \quad \therefore\ (-1,\ 0)\in R$

For $a=0,\ b-0=1 \Rightarrow b=1\in B$

$\therefore\ (0,\ 1)\in R$

For $a=1,\ b-1=1 \Rightarrow b=2\in B$

$\therefore\ (1,\ 2)\in R$

For $a=2,\ b-2=1 \Rightarrow b=3\notin B$

$\therefore\ (2,\ 3)\notin R$

For $a=3,\ b-3=1 \Rightarrow b=4\in B$

$\therefore\ (3,\ 4)\in R$

$\therefore\ R=\{(-1,\ 0),\ (0,\ 1),\ (1,\ 2),\ (3,\ 4)\}$

$\therefore\ \text{Domain of } R=\{-1,\ 0,\ 1,\ 3\}$

Video Solution:

Q9 **Text Solution:**

For $x=1,\ 1+x=2$ and $1+x^2=2$

$\therefore (2,\ 2)\in R$

For $x=2,\ 1+x=3$ and $1+x^2=5$

$\therefore (3,\ 5)\in R$

For $x=3,\ 1+x=4$ and $1+x^2=10$

$\therefore (4,\ 10)\in R$

For $x=4,\ 1+x=5$ and $1+x^2=17$

$\therefore (5,\ 17)\in R$

For $x=5,\ 1+x=6$ and $1+x^2=26$

$\therefore (6,\ 26)\in R$

$\therefore\ R$

$=\{(2,\ 2),\ (3,\ 5),\ (4,\ 10),\ (5,\ 17),\ (6,\ 26)\}$

$\Rightarrow \text{Domain of } R=\{2,\ 3,\ 4,\ 5,\ 6\}$

$\text{Range of } R=\{2,\ 5,\ 10,\ 17,\ 26\}$

Video Solution:

Q10 **Text Solution:**

For $x=1,\ 1+2y=10 \Rightarrow\ y=\frac{9}{2}\notin A$

$\therefore (1,\ \frac{9}{2})\notin R$

For $x=2,\ 2+2y=10 \Rightarrow\ y=4\in A$

$\therefore (2,\ 4)\in R$

For $x=3,\ 3+2y=10 \Rightarrow\ y=\frac{7}{2}\notin A$

$\therefore (3,\ \frac{7}{2})\notin R$

For $x=4,\ 4+2y=10 \Rightarrow\ y=3\in A$

$\therefore (4,\ 3)\in R$

For $x=5,\ 5+2y=10 \Rightarrow\ y=\frac{5}{2}\notin A$

$\therefore (5,\ \frac{5}{2})\notin R$

For $x=6,\ 6+2y=10 \Rightarrow\ y=2\in A$

$\therefore (6,\ 2)\in R$

For $x=7,\ 7+2y=10 \Rightarrow\ y=\frac{3}{2}\notin A$

$\therefore (7,\ \frac{3}{2})\notin R$

For $x = 8,\ 8 + 2y = 10 \Rightarrow\ y = 1 \in A$
$\therefore (8,\ 1) \in R$
For $x = 9,\ 9 + 2y = 10 \Rightarrow\ y = \frac{1}{2} \notin A$
$\therefore \left(9,\ \frac{1}{2}\right) \notin R$
For $x = 10,\ 10 + 2y = 10 \Rightarrow\ y = 0$
$\notin A\ \therefore (10,\ 0) \notin R$
$\therefore\ R = \{(2,\ 4),\ (4,\ 3),\ (6,\ 2),\ (8,\ 1)\}$

$\Rightarrow$ Domain of $R = \{2,\ 4,\ 6,\ 8\}$
Range of $R = \{4,\ 3,\ 2,\ 1\}$

Video Solution: