PARISHRAM 2026

Mathematics

DPP: 5

Relations and Functions

Q1 If the set A contains 5 elements and the set B contains 6 elements, then the number of one-one and onto mappings from A to B is
(A) 720 (B) 120
(C) 0 (D) None of these

Q2 Let set A has 7 elements and set B has 8 elements, then number of one-one mapping that can be defined from A to B is
(A) 56 (B) 5760
(C) 40320 (D) 192

Q3 Let N be the set of natural numbers and the function f : N $\rightarrow$ N be defined by f(n) = 2n + 3 $\forall \mathbf{n} \in \mathbf{N}$.Then f is
(A) surjective (B) injective
(C) bijective (D) none of these

Q4 The function $f : R \rightarrow R : f(x) = x^3$ is
(A) one-one and onto
(B) one-one and into
(C) many-one and onto
(D) many-one and into

Q5 Let $\mathbf{f : R \rightarrow R}$ 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

Q6 The function $f : R \rightarrow R,\ f(x) = \cos x$ is
(A) one-one and into
(B) one-one and onto
(C) many-one and into
(D) many-one and onto

Q7 The $f : N \rightarrow N,\ f(x) = x^2 + x + 1$ is
(A) one-one and onto
(B) one-one and into
(C) many-one and onto
(D) many-one and into

Q8 Let $f : R - \{8\} \rightarrow R$ be a function defined by $f(x) = \frac{x-7}{x-8}$, then
(A) f is One-One Onto
(B) f is One-One Into
(C) f is Many-One Onto
(D) f is Many-One Into

Q9 Let $f : \mathbf{R} \rightarrow \mathbf{R}$ be defined by $f(x) = \frac{x^2-8}{x^2+2}$, then f is
(A) one-one but not onto
(B) one-one and onto
(C) onto but not one-one
(D) neither one-one nor onto

Q10 The function

$$f : R \rightarrow R,\ f(x) = \begin{cases} 1, \text{ if } x \text{ is rational} \\ -1, \text{ if } x \text{ is irrational} \end{cases}$$

is
(A) one-one and into
(B) one-one and onto
(C) many-one and into
(D) many-one and onto

Answer Key

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

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

Total no. of element in set A = 5

Total no. of element in set B = 6

As, the no. of bijection from A to B can only possible when $n(\mathrm{A}) = n(\mathrm{B})$. But here $n(\mathrm{A}) < n(\mathrm{B})$

Hence, total no. of surjection from A to B is 0.

Video Solution:

Q2 Text Solution:

As we know when n(A) = m and n(B) = n

then no. of one -one functions $= {}^{n}P_{m}$

Given, n(A)=7 and n(B)=8

$\therefore$ no. of one-one mapping from A to B $= {}^{8}P_{7}$

$= \frac{8!}{(8-7)!}$

= 8!

= 40320

Video Solution:

Q3 Text Solution:

One-one

$f(n_1) = f(n_2)$

$\Rightarrow 2n_1 + 3 = 2n_2 + 3$

$\Rightarrow 2n_1 = 2n_2$

$\Rightarrow n_1 = n_2$

$\Rightarrow$f is one - one.

Onto

Let y = f(n) = 2n + 3

$\Rightarrow$ y – 3 =2n

$\Rightarrow n = \frac{y-3}{2} \notin \mathrm{N}$

$\therefore$f is not onto.

Video Solution:

Q4 Text Solution:

One - one

let $x_1, x_2 \in R$

such that $f(x_1) = f(x_2)$

$\Rightarrow x_1^3 = x_2^3$

$\Rightarrow x_1 = x_2$

Onto

let $f(x) = y$

$\Rightarrow x^3 = y$

$\Rightarrow x = y^{1/3}$

As for every $y \in R$ there exists $x\left(= y^{1/3}\right) \in R$ such that $f(x) = y \therefore f$ is onto

Video Solution:

Q5 Text Solution:

f: $\mathrm{R} \to \mathrm{R}$ is defined as $f(x) = x^4$

One-one

f(1) = f(–1) = 1.

Here f(1) = f(–1) but –1 $\neq$1, Hence f not one-one

Onto

For $-2 \in \mathrm{R}(\text{Co-domain})$ there does not exist pre-image in R (Domain)

$\therefore$ f is not onto.

Video Solution:

Q6 **Text Solution:**

One-one

f is not one-one i.e. many one

$\because f(0) = f(2\pi) = 1$

But $0 \neq 2\pi$

Onto

f is not onto function i.e. into function

$\because$Range of $f(x)$ = $[-1, 1] \neq$ R (Co-domain)

Video Solution:

Q7 **Text Solution:**

One-one

let $x_1, x_2 \in N$

such that $f(x_1) = f(x_2)$

$\Rightarrow x_1^2 + x_1 + 1 = x_2^2 + x_2 + 1$

$\Rightarrow x_1^2 - x_2^2 + x_1 - x_2 = 0$

$\Rightarrow (x_1 - x_2)(x_1 + x_2) + x_1 - x_2 = 0$

$\Rightarrow (x_1 - x_2)(x_1 + x_2 + 1) = 0$

$\Rightarrow x_1 - x_2$

$= 0 (\because x_1 + x_2 + 1 \neq 0 \text{ as } x_1, x_2 \in N)$

$\Rightarrow x_1 = x_2$

Onto

f is not onto i.e. into function

$\because$ for $1 \in N$ (Co-domain) there

does not exists $x \in N$ (Domain)

such that $f(x) = 1$

Video Solution:

Q8 **Text Solution:**

One-one

let $x_1, x_2 \in R$

such that $f(x_1) = f(x_2)$

$\Rightarrow \frac{x_1 - 7}{x_1 - 8} = \frac{x_2 - 7}{x_2 - 8}$

$\Rightarrow x_1 x_2 - 8x_1 - 7x_2 + 56 = x_1 x_2 - 7x_1 - 8x_2 + 56$

$\Rightarrow 8x_2 - 7x_2 = 8x_1 - 7x_1$

$\Rightarrow x_2 = x_1$

$\Rightarrow x_1 = x_2$

$\therefore f$ is one - one function

Onto

f is not onto i.e. into function

$\because$ for $1 \in R$ (Co-domain)

there does not exist $x \in \mathrm{R}$ (Domain)

such that $f(x) = 1$

Video Solution:

Q9 **Text Solution:**

One-one

Given, $f\left(x\right) = \frac{x^2 - 8}{x^2 + 2}$

$f\left(3\right) = \frac{9 - 8}{9 + 2} = \frac{1}{11}$

$f\left(-3\right) = \frac{9 - 8}{9 + 2} = \frac{1}{11}$

Here $f(3) = f(-3)$ but 3 $\neq$ -3.

$\Rightarrow f$ is not one-one.

Onto

Now, $f\left(x\right) = \frac{x^2 - 8}{x^2 + 2} = 1 - \frac{10}{x^2 + 2}$

So, minimum value of $f(x)$=1—5 = —4

$\therefore$ It is not onto.

Hence, it is neither one-one nor onto.

Video Solution:

Q10 **Text Solution:**

One-one

f is not one - one

$\because \quad f(2) = f(3) = 1$

But $2 \neq 3$

$\therefore$ f is many-one function

Onto

f is not onto function

$\because$ there exists $0 \in \mathbf{R}$ (Co-domain)

for which there is no pre-image in R (Domain)

Video Solution:

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