PARISHRAM 2026

Mathematics

Relations and Functions

DPP: 4

Q1 Complete set of domain of $f\left(x\right) = \frac{x-3}{x^2-4}$ is:

(A) $x \in (-2, 2) \cup (3, \infty)$
(B) $x \in (-\infty, -2) \cup (2, 3]$
(C) $x \in (-2, 2) \cup [3, \infty)$
(D) $x \in R - \{-2, 2\}$

Q2 If $f\left(x\right) = \frac{x-10}{10-x}$, then domain of $f(x)$ is

(A) $\{5\}$
(B) $R–\{10\}$
(C) R
(D) None of these

Q3 Domain of $\frac{1}{\sqrt{x^2-4}} + \frac{1}{x-3}$ is:

(A) $x \in (-\infty, -2) \cup (2, \infty)$
(B) $x \in (-\infty, -2] \cup [2, \infty)$
(C) $x \in (-\infty, -2) \cup (2, \infty) - \{3\}$
(D) $x \in (-\infty, -2) \cup (2, \infty) - \{4\}$

Q4 The domain of the function f defined by $f\left(x\right) = \sqrt{4-x} + \frac{1}{\sqrt{x^2-1}}$ is equal to

(A) $(-\infty, -1) \cup (1, 2]$
(B) $(-\infty, -1) \cup (1, 4]$
(C) $(-\infty, -1) \cup [1, 4]$
(D) $(-\infty, -1) \cup (1, 4)$

Q5 Domain of $f\left(x\right) = \sqrt{4x - x^2}$ is

(A) $R–[0,\ 4]$
(B) $R–(0,\ 4)$
(C) $(0, 4)$
(D) $[0, 4]$

Q6 The range of the function $f\left(x\right) = \frac{1+x^2}{x^2}$ is equal to

(A) $(0, 1)$
(B) $[0, 1]$
(C) $(1, \infty)$
(D) $[1, \infty)$

Q7 The range of the real function $f\left(x\right) = \frac{x+1}{x-3}$ is

(A) $R–\{3\}$
(B) $R–\{1\}$
(C) R
(D) $R–\{-3\}$

Q8 The range of the function $f\left(x\right) = \frac{1}{2-\cos 3x}$ is

(A) $\left[\frac{-1}{3}, 0\right]$
(B) R
(C) $\left[\frac{1}{3}, 1\right]$
(D) None of these

Q9 The range of the function $f\left(x\right) = \frac{|x+2|}{x+2}$ is

(A) $\{-1, 1\}$
(B) $\{-1, 0, 1\}$
(C) $(-1, 1)$
(D) $[-1, 1]$

Q10 Find the range of $f(x) = |x-1| - 1$.

(A) $[-1, \infty)$
(B) $[-1, 0]$
(C) $(-\infty, -1]$
(D) None of these

Answer Key

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

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

For $f(x)$ to be defined

$x^2 - 4 \neq 0$

$\Rightarrow x^2 \neq 4$

$\Rightarrow x \neq \pm\sqrt{4}$

$\Rightarrow x \neq \pm 2$

Video Solution:

Q2 Text Solution:

For *f*(*x*) to be defined, $10 - x \neq 0$

$\Rightarrow x \neq 10$

$\therefore$ Domain $= R$~$\{10\}$

Video Solution:

Q3 Text Solution:

For $f(x)$ to be defined

$x^2 - 4 > 0$ and $x - 3 \neq 0$

$\Rightarrow (x-2)(x+2) > 0$ and $x \neq 3$

$\Rightarrow x \in (-\infty, -2) \cup (2, \infty)$ and $x \neq 3$

$\Rightarrow x \in (-\infty, -2) \cup (2, \infty) - \{3\}$

Video Solution:

Q4 Text Solution:

For $f(x)$ to be defined

$4 - x \geqslant 0$ and $x^2 - 1 > 0$

$\Rightarrow x \leq 4$ and $(x-1)(x+1) > 0$

$\Rightarrow x \in (-\infty, 4] \cap x \in (-\infty, -1)$
$\cup (1, \infty)$

$\Rightarrow x \in (-\infty, -1) \cup (1, 4]$

Video Solution:

Q5 Text Solution:

Here, $f\left(x\right) = \sqrt{4x - x^2}$

Clearly, *f*(*x*) is defined for $4x - x^2 \geq 0$

i.e., $x(4 - x) \geq 0 \Rightarrow 0 \leq x \leq 4$

Video Solution:

Q6 Text Solution:

Domain

For *f*(*x*) to be defined

$x^2 \neq 0$

$\Rightarrow x \neq 0$

$\therefore$ Domain $= R$~$\{0\}$

Range

$f\left(x\right) = \frac{1+x^2}{x^2}$

$f\left(x\right) = \frac{1}{x^2} + 1$

Now $x^2 \geqslant 0$ for all $x \in R$

$\Rightarrow \frac{1}{x^2} > 0$

$\Rightarrow 1+\frac{1}{x^2}>1$

$\Rightarrow f(x)>1$

$\Rightarrow$ Range of $f(x)=(1, \infty)$

Video Solution:

Q7 Text Solution:

Domain

For *f*(*x*) to be defined

$x-3 \neq 0$

$\Rightarrow x \neq 3$

$\therefore$ Domain = R~$\{3\}$

Range

Let $y=f(x)$

$\Rightarrow y=\frac{x+1}{x-3}$

$\Rightarrow x y-3 y=x+1$

$\Rightarrow x y-x=3 y+1$

$\Rightarrow x(y-1)=3 y+1$

$\Rightarrow x=\frac{3 y+1}{y-1}$

$\Rightarrow y \in R$~$\{1\}$

$\therefore$ Range $=R$~$\{1\}$

Video Solution:

Q8 Text Solution:

We know that, $-1 \leq \cos 3x \leq 1$

$\Rightarrow -1 \leq -\cos 3x \leq 1$

$\Rightarrow 1 \leq 2-\cos 3x \leq 3$

$\Rightarrow \frac{1}{3} \leq \frac{1}{2-\cos 3x} \leq 1$

$\Rightarrow \frac{1}{3} \leq f(x) \leq 1$

$\therefore$ Range $(f)=\left[\frac{1}{3}, 1\right]$

Video Solution:

Q9 Text Solution:

$$f\left(x\right)=\frac{|x+2|}{x+2}=\begin{cases}\frac{x+2}{x+2}, & x+2>0 \\ -\frac{(x+2)}{x+2}, & x+2<0\end{cases}$$

$$=\begin{cases}1, & x>-2 \\ -1, & x<-2\end{cases}$$

$\therefore$ Range of $f(x)=\{-1,1\}$

Video Solution:

Q10 Text Solution:

As $|x-1| \geqslant 0$ for all $x \in R$

$\Rightarrow |x-1|-1 \geqslant -1$

$\Rightarrow f(x) \geqslant -1$

$\Rightarrow$Range of $f(x)=[-1, \infty)$

Video Solution: