

RELATION FUNCTION

Domain of $\frac{x-2}{x-1} > 2$

$\frac{1}{f(x)}$	$f(x) \neq 0$
$\sqrt{f(x)}$	$f(x) \geq 0$
$\frac{1}{\sqrt{f(x)}}$	$f(x) > 0$

$$\frac{x-2}{x-1} - 2 > 0$$

$$\frac{x-2-2x+2}{x-1} > 0$$

$$-x > 0$$

$$\frac{1}{(x-1)}$$

$$\frac{(x)}{(x-1)} < 0$$

$$\frac{(x-1)}{(x-1)}$$

$$+ \quad - \quad +$$

0

1

$$x \in (0, 1)$$

If $f(x) = \sqrt{\frac{x-2}{x-1} - 2}$ find Dom?

$$\frac{x-2}{x-1} - 2 \geq 0$$

RELATION FUNCTION

Domain (11th)

Type	
$\frac{1}{f(x)}$	$f(x) \neq 0$
$\sqrt{f(x)}$	$f(x) \geq 0$
$\frac{1}{\sqrt{f(x)}}$	$f(x) > 0$ $x \in (-\infty, -3] \cup [1, \infty)$

1) $y = \frac{1}{(x^2+2x-3)}$ $\xrightarrow{\frac{1}{f(x)}}$ find Dom

$$x^2+2x-3 \neq 0$$

$$(x+3)(x-1) \neq 0$$

$$x \neq -3, 1$$

$$x \in (-\infty, \infty) - \{-3, 1\}$$

2) $y = \sqrt{x^2+2x-3}$ $\xrightarrow{\sqrt{f(x)}}$ find Dom

$$x^2+2x-3 \geq 0$$

$$(x+3)(x-1) \geq 0$$



Q 3 $y = \frac{1}{\sqrt{x^2+2x-3}}$ $\xrightarrow{\frac{1}{\sqrt{f(x)}}$ find Dom?

$$x^2+2x-3 > 0$$

$$(x+3)(x-1) > 0$$



$$x \in (-\infty, -3) \cup (1, \infty)$$

RELATION FUNCTION

2 Bracket's Inequality

Q

Bhala fcn ke pass
fxn shor
or fcn Bde se Bda
Chhote se Chhota

$$\sin^2 \theta - \frac{1}{4} \geq 0$$

$$\left(\sin \theta - \frac{1}{2} \right) \left(\sin \theta + \frac{1}{2} \right) \geq 0$$

$\left(+\frac{1}{2} \right) B$ $-\frac{1}{2}$

$$\sin \theta \leq -\frac{1}{2} \cup \sin \theta \geq \frac{1}{2}$$

Q

$$x^2 - x - 6 < 0$$

$$(x-3)(x+2) < 0$$

$\textcircled{3}$ $\textcircled{-2}$

$$-2 < x < 3$$

$$x \in (-2, 3)$$

Bhala fcn ke shor
or fcn Darega
Darega Chh.
Apari

RELATION FUNCTION

Modulus Inequality

① $f(x) = |x|$ is Modulus fn

(2) $|x| = \sqrt{x^2}$

$$|x-1| = \sqrt{(x-1)^2}$$

$$|x+3| = \sqrt{(x+3)^2}$$

$$|6n0| = \sqrt{6n^20}$$

Modulus Sajjan.

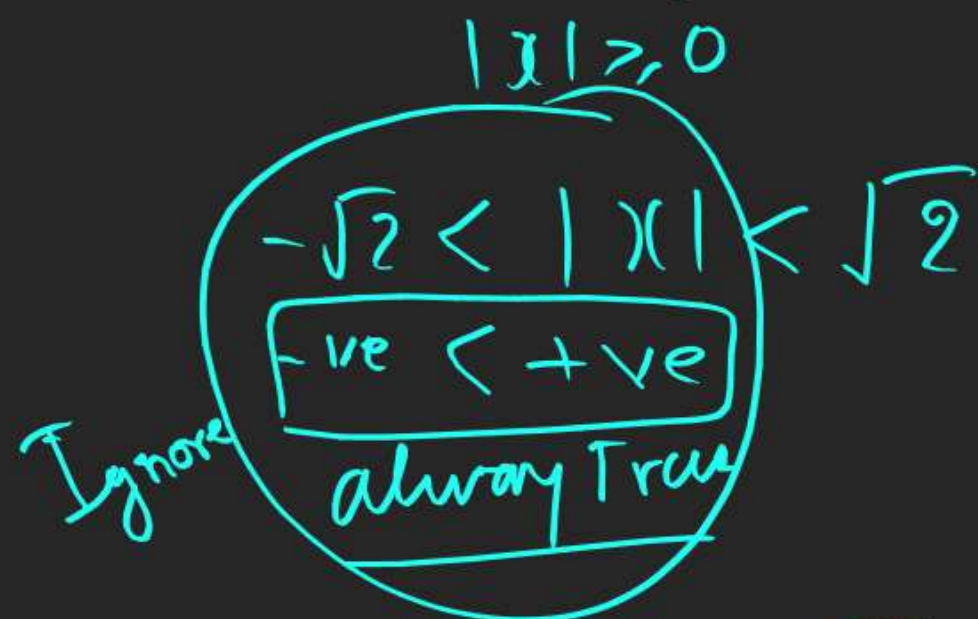
(3) $|-2| = -(-2) = 2$

$$|x| = \begin{cases} x & x \geq 0 \\ -x & x < 0 \end{cases}$$

Mod K andr betha fn agr +ve hai to as it is Binaur Nikal dega
Agr andr betha fn -ve hai to Minus K Sath Nikalega

RELATION FUNCTION

(4) $|x|$ is always +ve (NN)



$$|x| \Rightarrow |x| < \sqrt{2}$$

0

$$|x+5| \quad |x-2|$$

$x = -5$ 2

(5) Modulus Inequality

Q $|x| \leq 2$ find x

$$\Rightarrow \sqrt{x^2} \leq 2$$

Sqr $x^2 \leq 4$

$$x^2 - 4 \leq 0$$

2B $(x-2)(x+2) \leq 0$

$$-2 \leq x \leq 2$$

$$x \in [-2, 2]$$

HODA
Method
 $|x| \leq 2$



$$x \in [-2, 2]$$

RELATION FUNCTION

Artham \Rightarrow Bahar Ki Ghas

$$Q \quad |x-4| \leq 2$$



$$x \in [2, 6]$$

$$Q \quad |x-4| \geq 2$$



$$x \in (-\infty, 2] \cup [6, \infty)$$

Q $|x+5| > \overset{\text{Bahar}}{\text{Rassi}} \textcircled{3}$



$$x \in (-\infty, -8) \cup (-2, \infty)$$

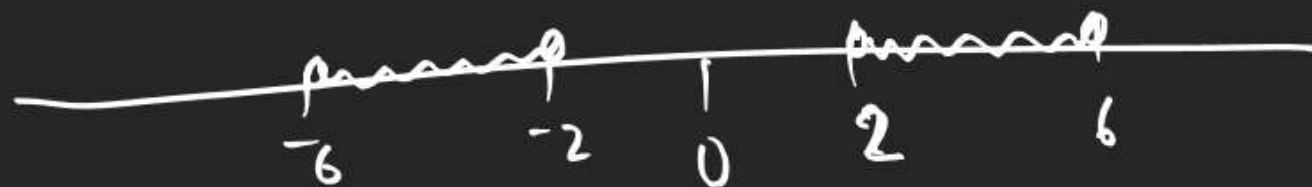
Q $|x+7| \leq \overset{\text{Andar}}{\text{Rassi}} 10$



$$x \in [-17, 3]$$

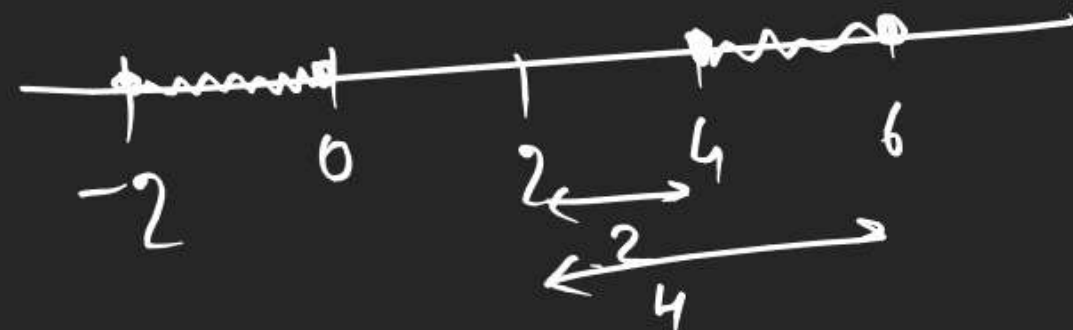
2, 6 mbhari

$$Q \quad 2 < |x| < 6$$



$$x \in (-6, -2) \cup (2, 6)$$

$$Q \quad 2 \leq |x-2| \leq 4$$



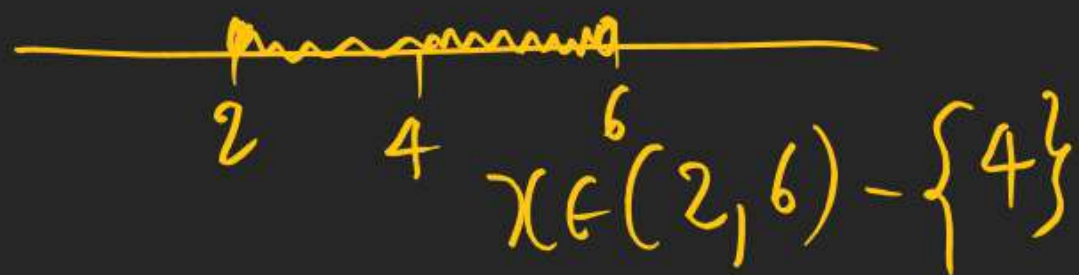
$$x \in [-2, 0] \cup [4, 6]$$

Q $5 \leq |x-3| \leq 7$



$$x \in [-4, -2] \cup [8, 10]$$

$$|x-4| < 2$$



Q If $f(x) = \frac{1}{\sqrt{\left|\frac{2}{x-4}\right| - 1}}$ find Domain

$\frac{1}{\sqrt{f(x)}}$ type

$$\left|\frac{2}{x-4}\right| - 1 > 0$$

$$\Rightarrow \left|\frac{2}{x-4}\right| > 1$$

$$\Rightarrow \frac{|2|}{|x-4|} > 1 \Rightarrow \frac{2}{|x-4|} > 1$$

\therefore

Domain (Advance)

(4)

$$Y = \sin^{-1} f(x) \text{ \& } Y = \cos^{-1} f(x) \text{ 's Domain}$$

$$\downarrow \quad \swarrow$$

$$-1 \leq f(x) \leq 1 \text{ \& solve}$$

Q. $Y = \sin^{-1}(x+3)$ find Dom?

$$-1 \leq (x+3) \leq 1 \quad -3$$

$$-4 \leq x \leq -2$$

$$x \in [-4, -2]$$

Q $Y = \sin^{-1}(4x-1)$ find Dom?

$$-1 \leq 4x-1 \leq 1 \quad +1$$

$$0 \leq 4x \leq 2 \quad \div 4$$

$$0 \leq x \leq \frac{1}{2}$$

$$x \in [0, \frac{1}{2}]$$

$$Q \text{ } f(x) = \cos^{-1}\left(\frac{1-|x|}{2}\right) \text{ find Dom?}$$

$$-1 \leq \frac{1-|x|}{2} \leq 1 \quad \times 2$$

$$-2 \leq 1-|x| \leq 2 \quad (+)$$

$$-3 \leq -|x| \leq 1 \quad (-) \times$$

$$3 \geq |x| \geq -1$$

\oplus $\geq -ve$ AT Ignore.

$$|x| \leq 3$$

$$x \in [-3, 3]$$



$$Q \text{ } f(x) = \cos^{-1}\left(\frac{1-2|x|}{3}\right)$$

find Dom?

$$-1 \leq \frac{1-2|x|}{3} \leq 1 \quad \times 3$$

$$-3 \leq 1-2|x| \leq 3 \quad (+)$$

$$-4 \leq -2|x| \leq 2 \quad (-) \times$$

$$4 \geq 2|x| \geq -2 \quad \div 2$$

$$2 \geq |x| \geq -1$$

$\boxed{|x| \geq -1}$ Ignore

$$|x| \leq 2 \quad x \in [-2, 2]$$



Q. find Dom of $y = \sin^{-1}\left(\frac{1+x^2}{2x}\right)$

$$\Rightarrow \boxed{-1 \leq x \leq 1} \quad \text{with } |x| \leq 1$$

Self
Under
standing

$$-1 \leq \frac{1+x^2}{2x} \leq 1$$

$$\left| \frac{1+x^2}{2x} \right| \leq 1$$

$$\Rightarrow \frac{|1+x^2|}{|2x|} \leq 1 \Rightarrow \frac{1+x^2}{2|x|} \leq 1$$

$$\Rightarrow 1+x^2 \leq 2|x| \Rightarrow |x|^2 - 2|x| + 1 \leq 0$$

$$\Rightarrow (|x|-1)^2 \leq 0 \Rightarrow (|x|-1)^2 = 0 \Rightarrow |x|-1=0$$

$$|x|=1 \Rightarrow x = \pm 1 \Rightarrow \boxed{x \in \{-1, 1\}}$$

Dom

Q find Dom of

$$(1) y = \frac{1}{\sqrt{1-|x|}}$$

$$(2) y = \frac{1}{1-|x|}$$

$$(3) y = \sqrt{2-2x+x^2}$$

$$(4) y = \sqrt{2-|x-3|}$$

$$(5) y = \sin^{-1}\left(\frac{x^2}{2}\right)$$

$$(6) y = \cos^{-1}(4x-1)$$

7) If

$$f(x) = \frac{(x-1)^{10000} (x-\frac{2}{3})^{57} (x-7)^4 (x+\frac{8}{7})^{927}}{(x+3)^{17} (x-2)^6 (x+6)^{12}}$$

then $x \in \sim$

$$\text{if } f(x) > 0$$

(8) find Dom of

$$y = \sqrt{\frac{1-|x|}{2-|x|}}$$