



## Homework - I

$$24) f(x) = \frac{5x+4}{x^2+3x+2}$$

Domain (D) consists of all points in  $\mathbb{R}$  except those points at which  $x^2+3x+2=0$

$$x^2+3x+2=0 \Rightarrow (x+1)(x+2)=0 \Rightarrow x=-1, \text{ or } x=-2$$

$$\text{So } D = \{x \in \mathbb{R} : x \neq -1 \text{ or } -2\}$$

This can also be written in the following forms -

$$D = (-\infty, -2) \cup (-2, -1) \cup (-1, \infty)$$

$$D = \mathbb{R} \setminus \{-1, -2\} \text{ or } \mathbb{R} - \{-1, -2\}$$

$$33) g(x) = \sqrt{x-5}$$

Domain (D) consists of all points in  $\mathbb{R}$  except those points at which  $x-5 < 0$

$$x-5 < 0 \Rightarrow x < 5 \text{ (or) } (-\infty, 5)$$

If we remove this from the real line we are left with  $[5, \infty)$

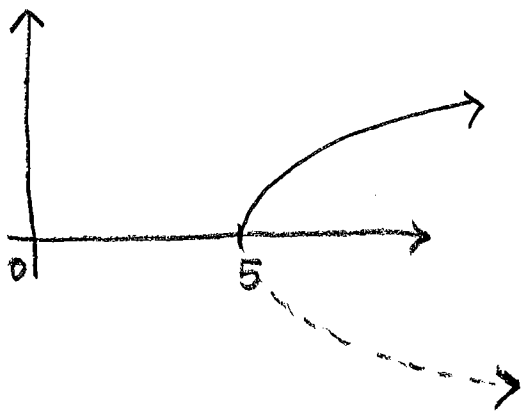
$$D = [5, \infty)$$

To plot the graph,

We square both sides of the equation

$$y = \sqrt{x-5} \text{ to get } y^2 = x-5$$

This refers to the following parabola



We don't include the bottom half as  $\sqrt{x-5}$  denotes the positive square root.

$$34) F(x) = |2x+1|$$

This is defined for all reals

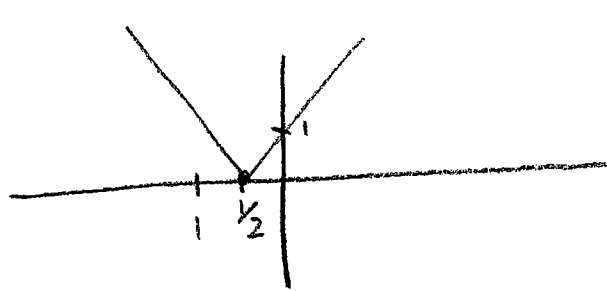
$$\text{So } D = (-\infty, \infty) \text{ (or) } \mathbb{R}$$

$$|2x+1| = \begin{cases} 2x+1, & (2x+1) \geq 0 \end{cases}$$

$$\begin{cases} -(2x+1) & (2x+1) < 0 \end{cases}$$

ie

$$|2x+1| = \begin{cases} 2x+1, & x \geq -1/2 \\ -(2x+1) & x < -1/2 \end{cases}$$

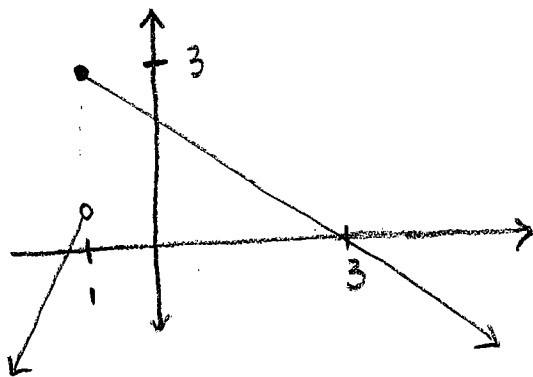


[Graph Q: 34]

$$38) f(x) = \begin{cases} 2x+3 & \text{if } x < -1 \\ 3-x & \text{if } x \geq -1 \end{cases}$$

This is defined for all reals

So  $D = \mathbb{R}$  (or)  $(-\infty, \infty)$



$$53) \begin{aligned} \text{Length of box (L)} &= 20 - 2x \\ \text{Width of box (W)} &= 12 - 2x \\ \text{Height of box (H)} &= x \end{aligned}$$

$$\text{Volume of box} = L \cdot W \cdot H = (20 - 2x)(12 - 2x)x$$

To find the domain, we use the conditions:

$$L > 0, W > 0 \text{ and } H > 0$$

$$L > 0 \text{ gives } 20 - 2x > 0 \Rightarrow x < 10$$

$$W > 0 \text{ gives } 12 - 2x > 0 \Rightarrow x < 6$$

$$H > 0 \text{ gives } x > 0$$

Domain (D) is :  $0 < x < 6$

