# 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 $x^2+3x+2=0$

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

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

This can also be written in the following forms -

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

$D = \mathbb{R} \setminus \{-1, -2\}$ 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 $x-5<0$

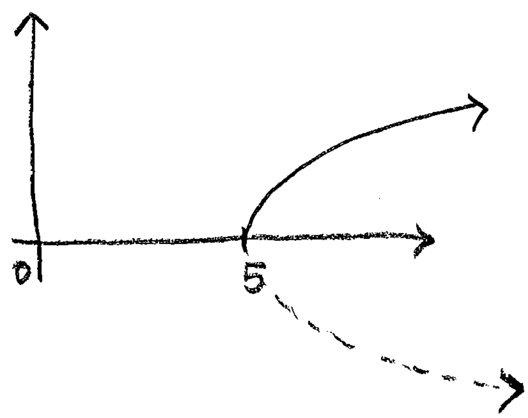
$x-5<0 \Rightarrow x<5$ (or) $(-\infty, 5)$

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

This refers to the following parabola




We dont include the bottom half as $\sqrt{x-5}$ denotes the positive square root.

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

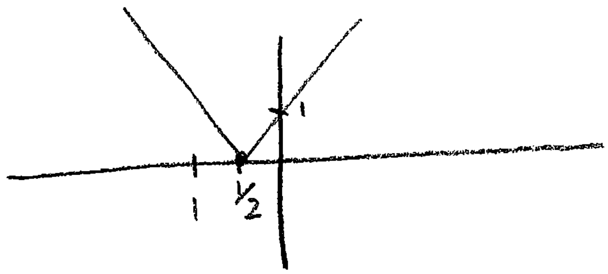
This is defined for all reals

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

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

ie

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

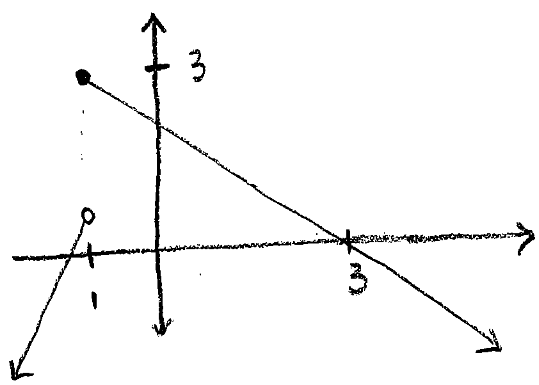



[Graph Q: 34]

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) Length of box (L) $= 20 - 2x$

Width of box (W) $= 12 - 2x$

Height of box (H) $= x$

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

To find the domain, we use the conditions

$L > 0$, $W > 0$ and $H > 0$

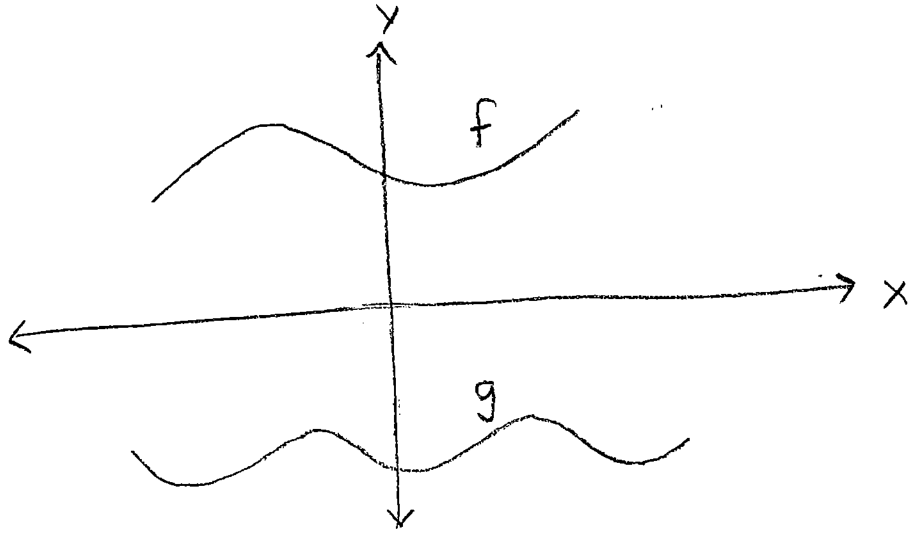
$L > 0$ gives $20 - 2x > 0 \Rightarrow x < 10$

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

$H > 0$ gives $x > 0$

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

58)




f is not symmetric about Y axis.

So f is not a even function

f is not symmetric about origin.

[Another way to realize this is that $f(0) \neq 0$. For odd functions $f(0) = 0$]

So f is not a odd function.

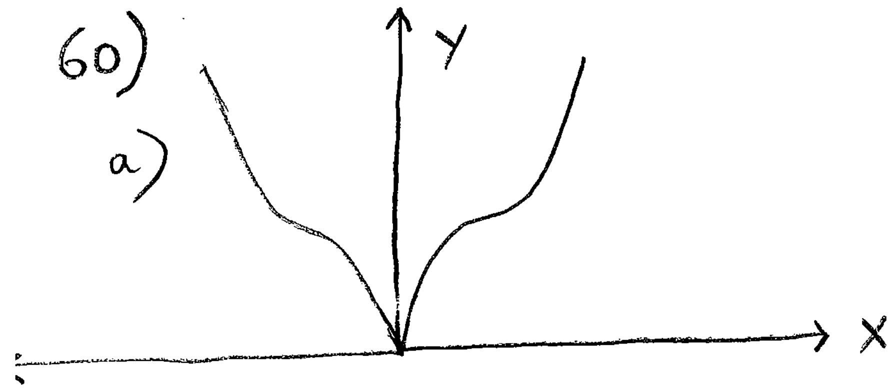
Hence f is neither even nor odd.

g is clearly symmetric about Y axis

So g is an even function.

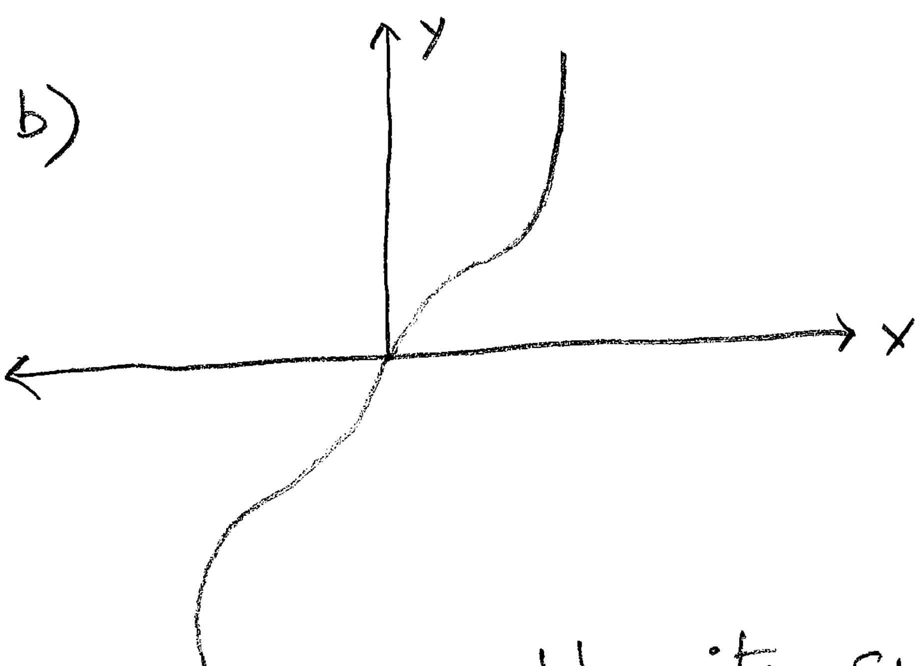
60)

a)




[If f is even, its symmetric about y-axis. So the rest of the graph is obtained by reflecting about y axis]

b)




[If f is odd, its symmetric about the origin. So the rest of the graph is obtained by rotating by 180° about the origin]