Lec No. 4

Exercise 1.2

Q.No 4. 1.2 Here $f(x)=1 \Rightarrow D_f: -\infty<x<\infty$ & $R_f: y=1$

& $g(x)=1+\sqrt{x} \Rightarrow D_g: 0\le x<\infty$ & $R_g: y\ge 1$

Now $\dfrac{g}{f} = \dfrac{1+\sqrt{x}}{1} = 1+\sqrt{x}$ $\therefore D_{g/f}: x\ge 0$ & $R_{g/f}: y\ge 1$ or $1\le y<\infty$

Q No. 6(b) Here $f(x)=x-1$ & $g(x)=\dfrac{1}{x+1}$

$$g(f(x)) = \frac{1}{f(x)+1} = \frac{1}{(x-1)+1} = \frac{1}{x}$$

$$\therefore g(f(1/2)) = \frac{1}{(1/2)} = 2$$

Q10 $f\circ g\circ h = f(g(h(x))) = f(g(\sqrt{2-x}))$

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

$h(x)=\sqrt{2-x}$, $g(x)=\dfrac{x^2}{x^2+1}$, $f(x)=\dfrac{x+2}{3-x}$

Q 12(f) $j\circ f\circ g\circ h = ----$ Easy

Q16(e) Here $f(x)=2-x$ & $g(x)=\begin{cases}-x, & -2\le x<0\\ x-1, & 0\le x\le 2\end{cases}$ (1)

$$\Rightarrow g(g) = \begin{cases}-g, & -2\le x<0\\ g-1, & 0\le x\le 2\end{cases}$$

$$\Rightarrow g(g(-1)) = \begin{cases}-g(-1), & -2\le x<0\\ g(-1)-1, & 0\le x\le 2\end{cases}$$

$$= \begin{cases}-(-1), & -2\le x<0\\ (-1-1)-1, & 0\le x\le 2\end{cases}$$ See Eqs (1)

$$= \begin{cases}1, & -2\le x<0\\ -3, & 0\le x\le 2\end{cases}$$, as reqd.

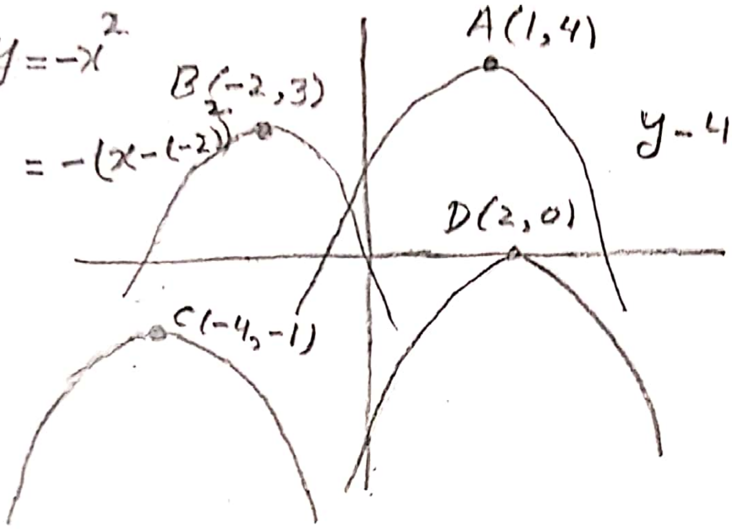
Q 17 to 20 See Q6

Q21 / 1.2 $V(t) = 2(2t-3)^2 + 7(2t-3) + 10$ $^\circ C$ (Easy) Here $S = 2t-3$

Q26 / 1.2 Here $y = -x^2$

$y - 3 = -(x-(-2))^2$

$y - 4 = -(x-1)^2$



$y - 0 = -(x-2)^2$

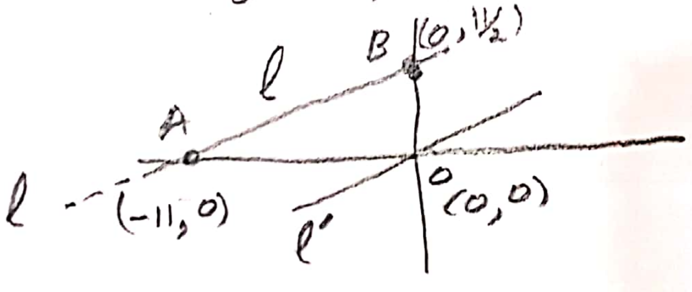
$y-(-1) = -(x-(-4))^2$

Q34 Here $l: y = \frac{1}{2}(x+1) + 5$ Down 5, $\Rightarrow K = -5$, right 1 $\Rightarrow h = +1$

By def., $\Rightarrow$ of The shifted graph is

$l: y - (-5) = \frac{1}{2}((x-1)+1) + 5 \Rightarrow l' \equiv y - 0 = \frac{1}{2}(x-0)$

$\therefore$ It passes Through $(0,0)$ & $\parallel l$



Putting $y = 0$ from l, $x = -11$

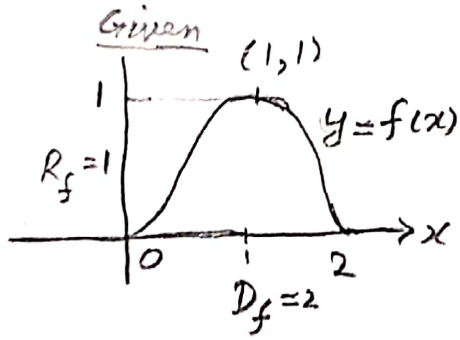
$\therefore A(-11, 0)$ lies on l

Putting $x = 0$ from l, $y = \frac{1}{2} + 5 = \frac{11}{2}$

$\therefore B(0, \frac{11}{2})$ lies on l

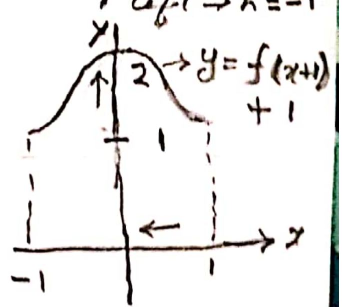
Q57(b)

Given



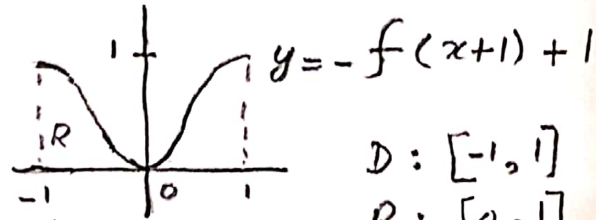
Step I:

$K = 1$ up $\uparrow$ 1 left $\Rightarrow h = -1$



Step II

After reflection



$D: [-1, 1]$

$R: [0, 1]$

D = Domain of $-f(x+1)+1$

Q59 / 1.2 $y = x^3$ stretched vertically by a factor of 3.

$y = 3x^3$ $\boxed{\text{See def P-17}}$ for Q59, 61, 63, 65

Q61 / 1.2 $y = x + \frac{1}{x} \Rightarrow y = \frac{1}{2}\left(x + \frac{1}{x}\right)$ is Compressed vertically by 2

Q63 $y = \sqrt{x+4} \Rightarrow y = \sqrt{2x+4}$ is Compressed horizontally by 2.

Q65 $y = \sqrt{4 - x^2} \Rightarrow y = \sqrt{4 - \left(\frac{x}{2}\right)^2}$ " streched " " " by 2.

Q79(g) f is even & g is odd

$g \circ f(-x) = g(f(x)) = g \circ f(x)$ $\left\{\begin{array}{l} \because f(-x) = f(x) \\ \because f \text{ is even} \end{array}\right\}$

$\therefore g \circ f$ is even

(i) $g \circ g(-x) = g(g(-x)) = g(-g(x))$

$= -g(g(x)) \Rightarrow g \circ g(-x) = -g \circ g(x)$

$\therefore$ By $g \circ g$ is odd.

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