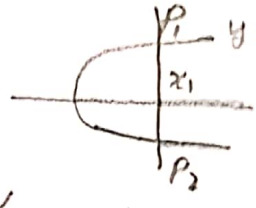
Lec (3)

Exercise 1.1 P-11

Q3 $D_F = [-2, \infty)$, $R_F = [0, \infty)$

Q7(a) It fails vertical line test
∴ It is not graph of a fn.



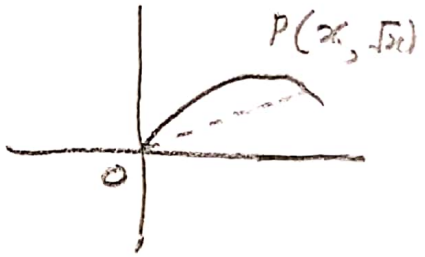
Q11 $d^2 = x^2 + x^2 + x^2 \Rightarrow x = \frac{1}{\sqrt{3}} d$, as req'd
(diagonal d)

Surface area $A = 6x^2 = 6\frac{d^2}{3} = 2d^2$

Vol $V = x^3 = \left(\frac{1}{\sqrt{3}} d\right)^2 = \frac{1}{3\sqrt{3}} d^2$

Q12 $f(x) = \sqrt{x}$ As $f(x) = y$

$\Rightarrow$ The pt. P is $P(x, \sqrt{x})$ —(i)



Let slope of $\overline{OP} = m$,

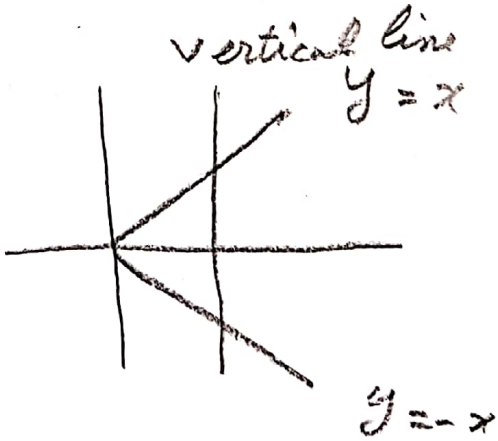
Then $m = \frac{\sqrt{x} - 0}{x - 0} = \frac{1}{\sqrt{x}} \Rightarrow x = \frac{1}{m^2}$ —(ii)

From m in (i) & (ii), we get the co-ords of P are $\left(\frac{1}{m^2}, \frac{1}{m}\right)$

Q23(a) Here $|y| = x$ i.e. x is always +ve

$\pm y = x$

$\Rightarrow y = x$ & $y = -x$



It fails the vertical line test. ∴ By def. it is not graph of a fn.

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Exercise 1.1

Q24(a) $|x|+|y|=1$

$1.1 \Rightarrow \pm x \pm y = 1$

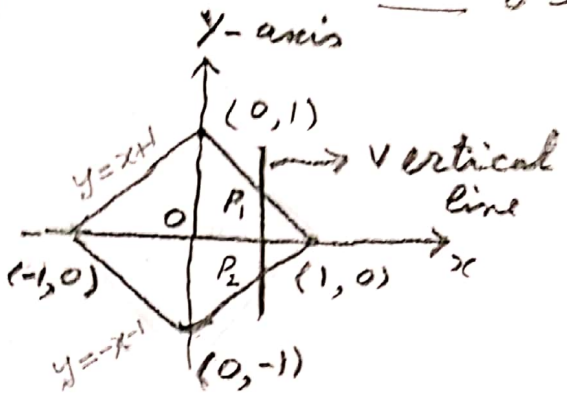
or $\pm y = \mp x + 1$

(i) $y = -x+1$

(ii) $y = x+1$

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

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

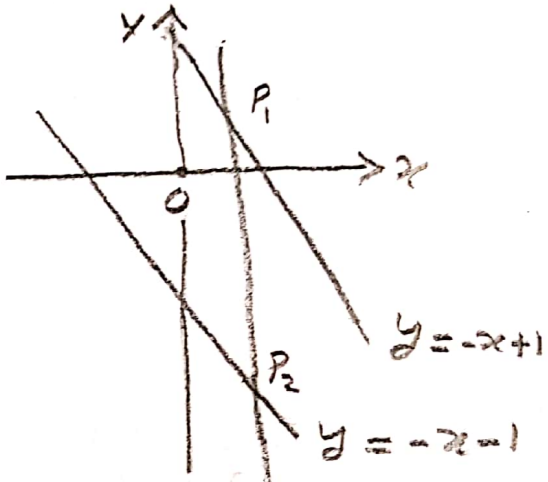


It fails vertical line test ∴ It is not graph of a fn.

(b) $|x+y| = 1 \Rightarrow \pm(x+y)=1$

$\Rightarrow y = -x \pm 1$

From fig it fails vertical line test ∴ It is not graph of a fn.



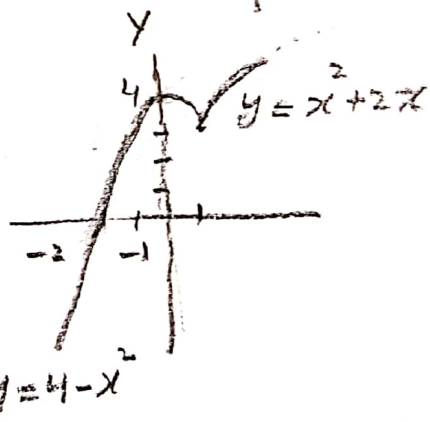
Q27. $F(x) = \begin{cases} 4-x^2, & x \le 1 \\ x^2+2x, & x > 1 \end{cases}$

$y = 4-x^2, \; x \le 1$

x	-3	-2	-1	0	1
y	-5	0	3	4	3

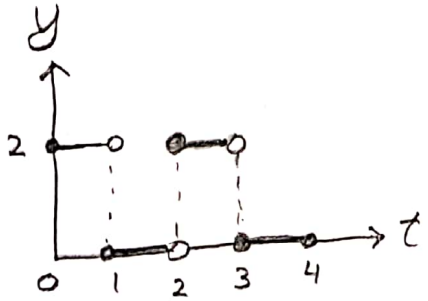
$y = x^2+2x, \; x > 1$

x	1.5 = 3/2	2	2.5	-	-
y	5.25	8	-	-	-



Q29(b)

$$f(x) = \begin{cases} 2, & 0 \le x < 1 \\ 0, & 1 \le x < 2 \\ 2, & 2 \le x < 3 \\ 0, & 3 \le x \le 4 \end{cases}$$



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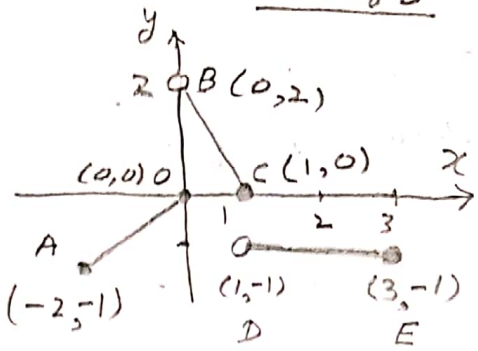
Exercise 1.1



1.1 Q31 (b) For $-2 \le x \le 0$

Pt is on $\overline{AO}$ with $\Rightarrow$,

$$y-(0) = \frac{-1-0}{-2-0}(x-0)$$

or $y = \frac{1}{2}x$ ——————(i)

For $0 < x \le 1$

$\Rightarrow$ eq of $\overline{BC}$ is $y-2 = \frac{0-2}{1-0}(x-0) \Rightarrow y-2 = -2x$

or $y = -2x+2$

Obviously for $0 < x \le 3$, $y = -1$

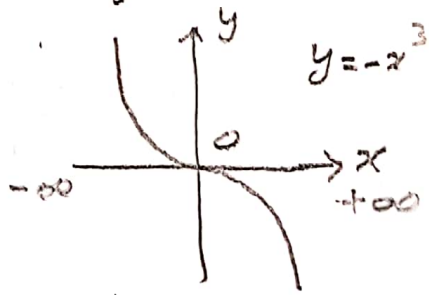
$$\therefore f(x) = \begin{cases} \frac{1}{2}x, & -2 \le x \le 0 \\ -2x+2, & 0 < x \le 1 \\ -1, & 1 < x \le 3 \end{cases}$$

Q33 (a) By def $\lfloor x \rfloor = 5 \Rightarrow 5 \le x < 6$ { Bracket fn, Step fn, Integer floor fn, greatest integer fn

(b) " " $\lceil x \rceil = 5 \Rightarrow 4 < x \le 5$ { ceiling fn, least integer fn } { $f(x) = \min\{z \in \mathbb{Z} : z \ge x\}$

Q34 $\lfloor x \rfloor = \lceil x \rceil$ $\forall$ integral values of x.

Q37 From fig fn is sym about origin & Decreasing for $-\infty < x < \infty$

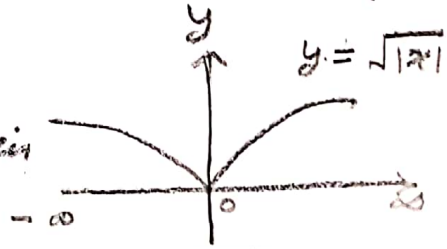


Q41 From fig

$f(x)$ is sym about y-axis

Increasing fn $0 \le x < \infty$

& decreasing fn $-\infty < x \le 0$



$y = \sqrt{|x|}$

x	-2	-1	0	1	2
y	$\sqrt{2}$	1	0	1	$\sqrt{2}$

Q49 N , **Q51** O **Q58** E

very easy.

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