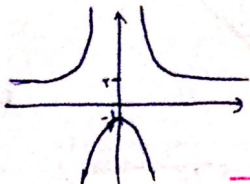


1- ا) $y = \frac{\ln|+1|}{\ln|-r|} \rightarrow$  $\Rightarrow R_f = \mathbb{R} - (-\frac{1}{r}, \frac{1}{r}]$

19

أ- $\frac{\ln|+1|}{\ln|-r|}$

(2)

ب) $y = \frac{n^r+1}{\ln 1} = \ln 1 + \frac{1}{\ln 1} \rightarrow R_f = [r, +\infty)$

2- $y = \frac{n^r+n-r}{n+r} \rightarrow n^r+n-r = y(n+r) \rightarrow n^r+(r-y)n+(-r-ry) = 0$

(2)

2 $n = \frac{y+r \pm \sqrt{(r-y)^2+4y+4}}{2} \rightarrow (r-y)^2+4y+4 \geq 0 \rightarrow y^r+r-4y+4y+4 \geq 0$

2 $y^r+4y+4 \geq 0 \rightarrow (y+2)(y+2) \geq 0 \rightarrow R_f = \mathbb{R} - (-4, \frac{1}{r}]$

3- $f(n) = \frac{n^r-n+\frac{1}{r}}{n^r-n+1} \rightarrow$

$D_f = \mathbb{R}$

$\rightarrow n^r-n+\frac{1}{r} = y(n^r-n+1) \rightarrow (y-1)n^r+(1-y)n+(y-\frac{1}{r}) = 0$

(2)

$\rightarrow n = \frac{y-1 \pm \sqrt{(1-y)^2-4(y-\frac{1}{r})(y-1)}}{2(y-1)} \rightarrow y^r-ry+1-4y^r+4y-1 \geq 0 \rightarrow -3y^r+4y \geq 0 \rightarrow y^r-y \leq 0 \rightarrow \frac{y^r}{y} \leq \frac{1}{y} \rightarrow y = [0, 1]$

$\Rightarrow R_f = [0, 1]$

4- ا) $y = \sqrt{-n^r+n-1} \rightarrow -n^r+n-1 \leq -\frac{14-r}{r} \rightarrow \sqrt{-n^r+n-1} \leq \sqrt{\frac{14-r}{r}} \rightarrow R_f = [0, \sqrt{\frac{14-r}{r}}]$

(2)

ب) $y = \sqrt[n^r]{n^r-1} \rightarrow n^r-1 \geq -\frac{4r}{1} \rightarrow R_f = [-1, +\infty)$

5- ا) $y = \log(\underbrace{n^r-n+1}_{\mathbb{R}}) \rightarrow R_y = \mathbb{R}$

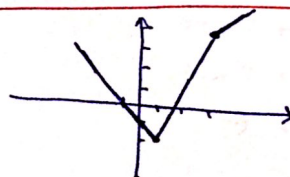
(2)

ب) $y = \log_r(\frac{n^r+1}{n}) \rightarrow \frac{n^r+1}{n} = n + \frac{1}{n} \rightarrow R = (-\infty, -r] \cup [r, +\infty)$

$\rightarrow \log_r([r, +\infty)) = [1, +\infty) \rightarrow R_y = [1, +\infty)$

6- ا) $y = |n-r| - |n-r|$ $\begin{cases} n+1 ; r \leq n \\ rn-a ; 1 \leq n \leq r \\ -n-1 ; x \leq 1 \end{cases}$

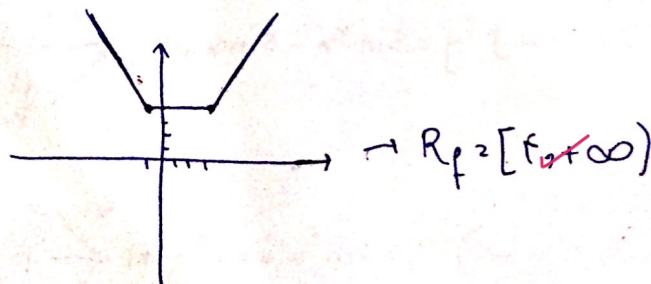
$\Rightarrow R_f = [-r, +\infty)$



(2)

ب) $y = |n-r| + |n+1|$

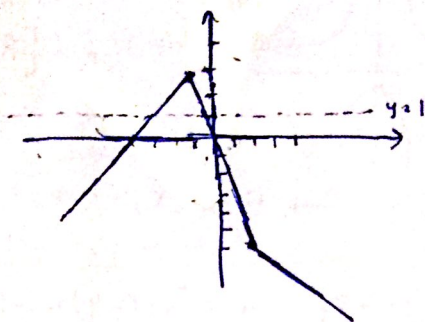
2 $\begin{cases} -2n+2 ; x \leq -1 \\ r ; -1 \leq x \leq r \\ rn-r ; r \leq n \end{cases}$



$\rightarrow R_f = [r, +\infty)$

7- $|x-2| - |x+2| \leq 1$

$$\begin{cases} x-4 & ; x \leq -2 \\ -x & ; -2 \leq x \leq 2 \\ x+4 & ; x \geq 2 \end{cases}$$

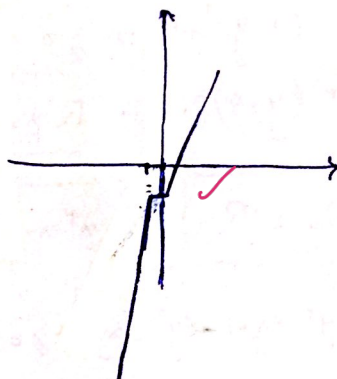


$\rightarrow \mathbb{R} - \left(-3, -\frac{1}{2}\right)$

(2)

8- $y = 2x - |x+1| + |x|$

$$\begin{cases} x+1 & ; x \leq -\frac{1}{2} \\ -1 & ; -\frac{1}{2} \leq x \leq 0 \\ x-1 & ; 0 \leq x \end{cases}$$



$\rightarrow R_f = \mathbb{R}$

(2)

9- ا) $y = [x] + [3-x] = [x] + [-x] + 3$

$[-2, -1) \rightarrow -2 + 5 = 3$

$[-1, 0) \rightarrow -1 + 4 = 3$

$[0, 1) \rightarrow 0 + 3 = 3$

$[1, 2) \rightarrow 1 + 2 = 3$

$2 \rightarrow 2 + 1 = 3$

ب) $y = 3x - [x]$

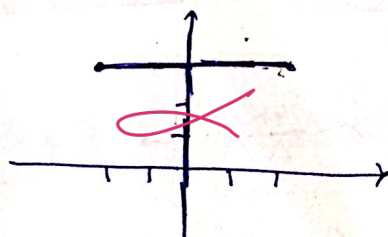
$[-2, -1) \rightarrow 3x + 2$

$[-1, 0) \rightarrow 3x + 1$

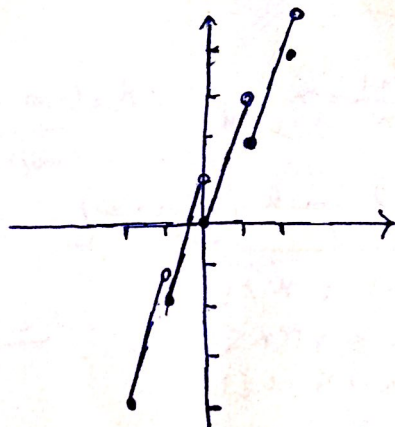
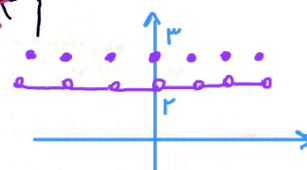
$[0, 1) \rightarrow 3x + 0$

$[1, 2) \rightarrow 3x - 1$

$2 \rightarrow 6$



$R_f = \{3\}$



$R_f = [-1, 2)$

(1)

10- ا) $y = \sin^2 x - \sin x + 1$

$\begin{cases} 1 \rightarrow 1 \\ -1 \rightarrow 1 \text{ max} \\ \frac{1}{2} \rightarrow \frac{7}{4} \text{ min} \end{cases}$

$\rightarrow R_f = \left[\frac{7}{4}, 1\right]$

ب) $y = \sin^2 x + \sin^2 x + 1$

$\begin{cases} 0 \rightarrow 1 \text{ min} \\ 1 \rightarrow 2 \text{ max} \\ -\frac{1}{2} \times \end{cases}$

$R_f = [1, 2]$

(2)