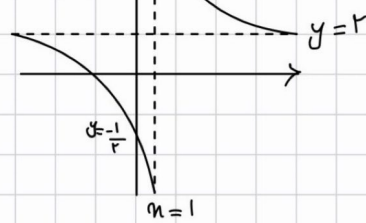


$$y = \frac{|n|+1}{|n|-2}$$

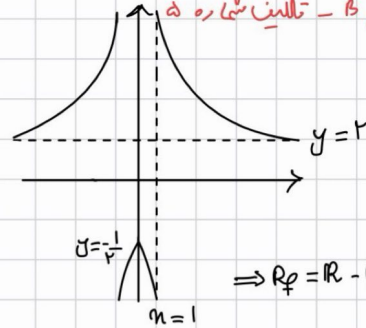
مجاانب قائم = ۲

مجاانب افق = ۱

$$y = \frac{n+1}{n-2}$$



$$y = \frac{|n|+1}{|n|-2}$$



$$\Rightarrow R_f = \mathbb{R} - (-\frac{1}{2}, 2]$$

$$y = \frac{n^2 + 2n - 2}{n + 3} \rightarrow yn + 3y = n^2 + 2n - 2 \rightarrow n^2 + (2-y)n - 3y - 2 = 0 \rightarrow \frac{y-2 \pm \sqrt{\Delta}}{2}$$

$$\Delta \geq 0 \Rightarrow (2-y)^2 - 4(1)(-3y-2) = y^2 - 4y + 4 + 12y + 8 = y^2 + 8y + 12 = 0 \Rightarrow \frac{-y-4}{2}$$

$$R_f = \mathbb{R} - (-4, -2]$$

$$y = \frac{n^2 - n + \frac{1}{k}}{n^2 - n + 1}$$

$$\rightarrow n^2 - n + 1 \neq 0 \rightarrow \Delta = 1 - 4(1) \rightarrow \Delta < 0 \rightarrow \text{هوا} \rightarrow R_f = \mathbb{R}$$

$$\rightarrow yn^2 - yn + y = n^2 - n + \frac{1}{k} \rightarrow n^2(y-1) + n(1-y) + y - \frac{1}{k} = 0$$

$$\Rightarrow \frac{y-1 \pm \sqrt{\Delta}}{2(y-1)} \rightarrow y \neq 1 \Rightarrow$$

$$\Delta \geq 0 \rightarrow (1-y)^2 - 4(y-1)(y-\frac{1}{k}) \geq 0 \rightarrow (y-1)[y-1-4(y-\frac{1}{k})] \rightarrow (y-1)(-3y+\frac{4}{k}) \geq 0 \Rightarrow$$

$$\frac{0}{-1} + \frac{1}{\frac{4}{k}} \Rightarrow R_f = [0, 1)$$

$$\text{الف) } y = \sqrt{-n^2 + 4n - 1} \rightarrow \text{ent} \left| \begin{array}{c} -\frac{b}{4a} \\ y_1 \end{array} \right| \begin{array}{c} 2 \\ 3 \end{array} \rightarrow \text{بردهشته} = (-\infty, 3] \rightarrow R_f = [0, 3]$$

$$\text{ب) } y = \sqrt[3]{2n^2 - 11n} \rightarrow \text{ent} \left| \begin{array}{c} 2 \\ -11 \end{array} \right| \rightarrow \text{بردهشته} = [-11, +\infty) \Rightarrow R_f = [-2, +\infty)$$

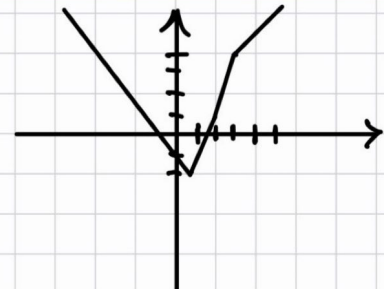
$$\text{الف) } y = \log(n^2 - n + 11) \rightarrow \text{بردهشته} = (-\infty, +\infty) \Rightarrow R_f = \mathbb{R}$$

$$\text{ب) } y = \log_2\left(\frac{n^2+1}{n}\right) \rightarrow \frac{n^2+1}{n} = n + \frac{1}{n} \rightarrow \text{بردهشته} = [2, +\infty) \rightarrow \log_2 [2, +\infty) \Rightarrow R_f = [1, +\infty)$$

$$\text{الف) } y = |2n-2| - |n-3|$$

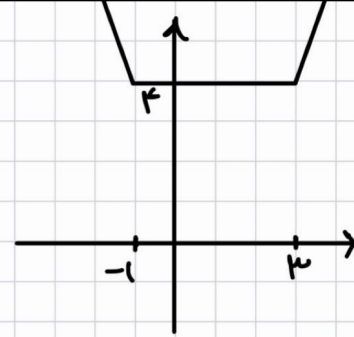
$$\begin{array}{c|c|c} 1 & 3 & \\ \hline -n-1 & 2n-5 & n+1 \end{array}$$

$$\Rightarrow R_f = [-2, +\infty)$$



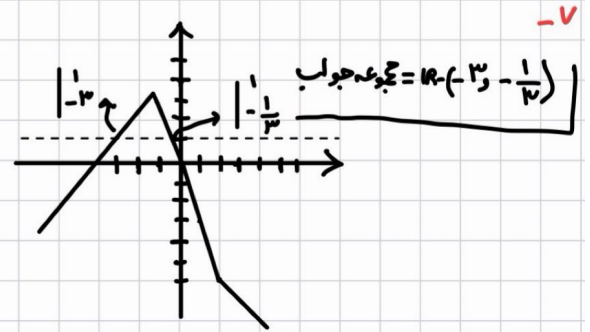
ب) $y = |n - 2| + |n + 1| \rightarrow 2 - (-1) = 3$

$R_f = [3, +\infty)$ $\Leftarrow$



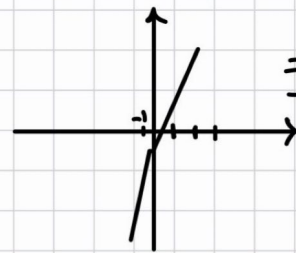
$|n - 2| - |2n + 2| \leq 1$

$\begin{array}{c|c|c} -1 & 2 & \\ \hline n+2 & -2n & -n-2 \end{array}$



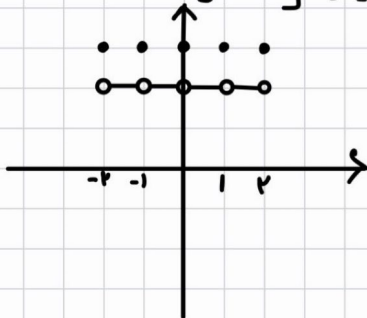
$y = 2n - |2n + 1| + |n|$

$\begin{array}{c|c|c} -1/2 & 0 & \\ \hline 2n+1 & -1 & 2n-1 \end{array}$

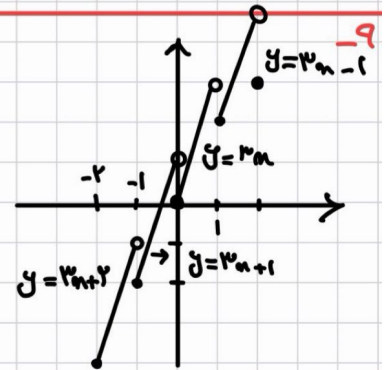


$\Rightarrow R_f = \mathbb{R}$

الف) $y = [n] + [2 - n] = [n] + [-n] + 2$



ب) $y = 2n - [n]$



الف) $y = \sin^2 n - \sin n + 1 \rightarrow \sin n = 1 \rightarrow 1 - 1 + 1 = 1$

$\rightarrow \sin n = -1 \rightarrow 1 + 1 + 1 = 3 \Rightarrow R_f = \left[\frac{2}{3}, 3 \right]$

$\rightarrow -\frac{b}{a} = \frac{1}{2} \rightarrow \frac{1}{2} - \frac{1}{2} + 1 = \frac{2}{3}$

ب) $y = \sin^2 n + \sin^2 n + 1 \rightarrow \sin^2 n = 1 \rightarrow 1 + 1 + 1 = 3$

$\rightarrow \sin^2 n = 0 \rightarrow 0 + 0 + 1 = 1 \Rightarrow R_f = [1, 3]$

$\rightarrow -\frac{b}{a} = -\frac{1}{2} \rightarrow \text{عق}$