

الف) $\frac{|n|+1}{|n|-2} > y \rightarrow |n| < \frac{-2y-1}{y-1} \Rightarrow |n| = \frac{2y+1}{y-1}$ -1

$\frac{2y+1}{y-1} \geq 0 \Rightarrow \frac{-\infty - \frac{1}{2} + \infty}{+\frac{1}{2} - \frac{1}{2} +} \Rightarrow R = (-\infty, -\frac{1}{2}] \cup (1, +\infty)$

ب) $y = \frac{n^2+1}{|n|} \Rightarrow y \leq |n| + \frac{1}{|n|} \xrightarrow{|n| > 0} R = [2, +\infty)$
 مینیمم: $n + \frac{1}{n}$

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

$\Delta = (2-y)^2 - 4(-2-2y)$

$(2-y)^2 - 4(-2-2y) \geq 0 \rightarrow y^2 + 4y + 12 \geq 0 \Rightarrow \frac{-\infty - 4 - 2 + \infty}{+\frac{1}{2} - \frac{1}{2} +} \Rightarrow R = (-\infty, -4] \cup [-2, +\infty)$

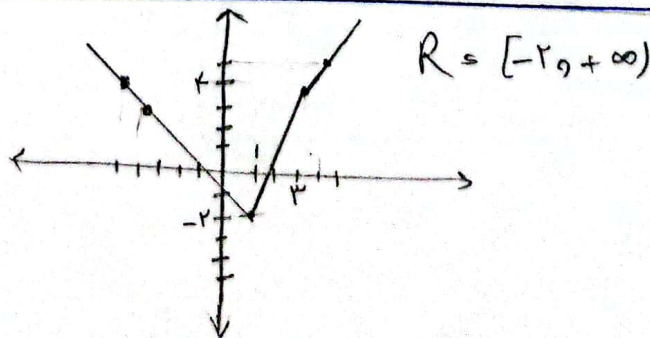
$n^2 - n + 1 \rightarrow \Delta < 0 \Rightarrow D_f = \mathbb{R}$

$\frac{(n-\frac{1}{2})^2}{n^2 - n + 1} \xrightarrow[n \rightarrow +\infty]{\substack{\text{فاقد ریشه} \\ \text{مینیمم} \\ \text{max}}} 0 \Rightarrow [0, 1) = R$
 $\frac{n^2 - n + 1 - \frac{1}{4}}{n^2 - n + 1} \xrightarrow{n \rightarrow +\infty} 1 - \frac{\frac{1}{4}}{+\infty} = 1$

الف) $\left| \frac{n^2}{n^2+1} \right| \leq \frac{1}{2} \Rightarrow (-\infty, \frac{1}{2}] \xrightarrow{\text{حداکثر}} R = [0, \frac{1}{2}]$ -3
 ب) $\left| \frac{n^2}{n^2+1} \right| \geq \frac{1}{2} \Rightarrow R = [-2, +\infty)$ -4

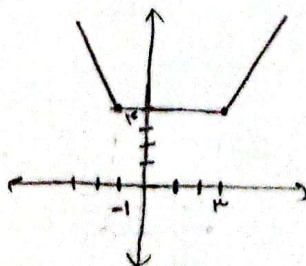
الف) $n^3 - n + 1 > 0 \Rightarrow (-\infty, +\infty) \xrightarrow{R = \mathbb{R}}$ -5
 ب) $D_f \Rightarrow \frac{n^2+1}{n} > 0 \rightarrow \frac{-\infty - \frac{1}{2} + \infty}{-\frac{1}{2} - \frac{1}{2} +} \rightarrow D_f = (0, +\infty) = \mathbb{R}$
 $R = [1, +\infty)$

الف) $n=1 \rightarrow -2$
 $n=3 \rightarrow 4$
 $n=-\infty \rightarrow 4$
 $n=4 \rightarrow \infty$

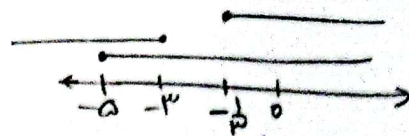


ب) $n=3 \rightarrow 4$
 $n=-1 \rightarrow 4$

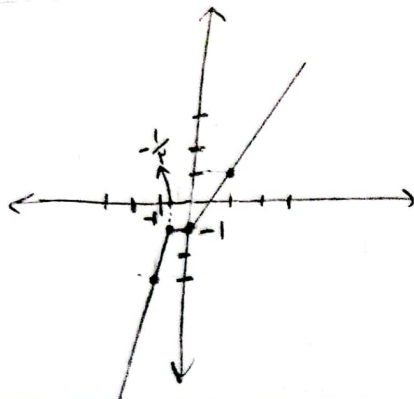
$R = [4, +\infty)$



$$\begin{array}{c|c|c}
 -\infty & -1 & 1 & +\infty \\
 \hline
 -x+1+x+1 \leq 1 & -x+1-x-1 \leq 1 & x-1-x-1 \leq 1 \\
 x \leq -3 & x \geq -\frac{1}{3} & -\infty \leq x
 \end{array}$$



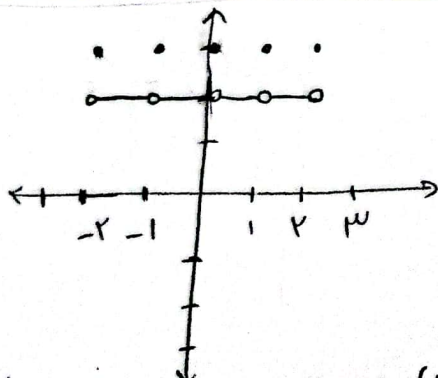
$$R = [-\infty, -1] \cup [-\frac{1}{3}, +\infty)$$



$$\begin{cases}
 x=0 \rightarrow -1 \\
 x=-\frac{1}{3} \rightarrow -1 \\
 x=-1 \rightarrow -3 \\
 x=1 \rightarrow 1
 \end{cases}$$

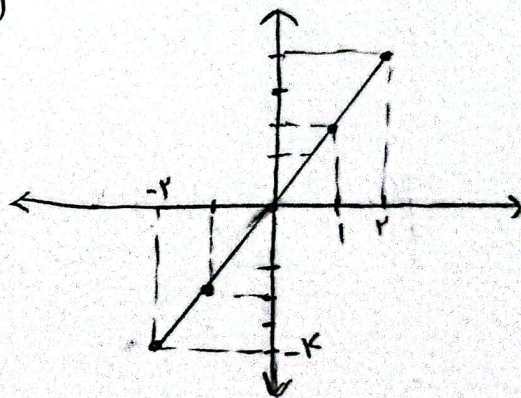
$$R = \mathbb{R}$$

الف)



$$\begin{aligned}
 & \underbrace{0 \leq -1}_{[x] + [-x] + 1} \rightarrow \begin{cases} x-1 \leq 1 \\ x+0 \leq 1 \end{cases} \Rightarrow R = \{1, 3\}
 \end{aligned}$$

ب)



الف) $y = \sin^2 x - \sin x + 1$

$$\sin x = 1 \rightarrow 1$$

$$\sin x = -1 \rightarrow 3 \Rightarrow R = [\frac{1}{3}, 3]$$

$$-\frac{1}{3} \rightarrow \sin x = \frac{1}{3} \rightarrow \frac{1}{3}$$

ب) $y = \sin^2 x + \sin x + 1$

$$\sin^2 x = 1 \rightarrow 3$$

$$\sin^2 x = 0 \rightarrow 1$$

$$\Rightarrow R = [1, 3]$$

$$-\frac{1}{3} \rightarrow \sin^2 x = -\frac{1}{3} \text{ (not possible)}$$