

(کالیف ۴۰)

(ف طر شانس)

(دوازدهم دفتر B)

$$\begin{aligned} n \rightarrow f(-n) - n f(n) &= 2|n|+1 \rightarrow f(-n) = 2|n|+1 + n f(n) \\ -n \rightarrow f(n) + n f(-n) &= 2|-n|+1 \end{aligned}$$

$$f(n) + n(2|n|+1 + n f(n)) = 2|n|+1 \rightarrow 2n|n| + n + f(n)(n^2+1) = 2|n|+1 \quad [1]$$

$$f(n)(n^2+1) = 2|n|+1 - 2n|n| - n$$

$$f(n) = \frac{(2|n|+1)(1-n)}{n^2+1}$$

$$n=0 \rightarrow 2f(0) = 0 - 3(0) + 4 = 4 \rightarrow f(0) = 2$$

$$f(n) + f(0) = n^2 - 3n + 3 + 2 \rightarrow f(n) = n^2 - 3n + 3$$

$$f(n^2) = (n^2)^2 - 3(n^2) + 3$$

$$f(n^2) = n^4 - 3n^2 + 3 \quad [2]$$

$$y^n - y = n^2 + n + 2$$

$$n^2 + (1-y)n + 2+y = 0$$

$$\frac{-(1-y) \pm \sqrt{(1-y)^2 - 4(2+y)(1)}}{2}$$

$$\rightarrow 1+y^2-2y-4-4y \geq 0$$

$$y^2-4y-3 \geq 0$$

$$(y-5)(y+1) \geq 0$$

$$R_f = (-\infty, -1] \cup [5, +\infty) \quad [3]$$

$$\text{الف) } y = 2n^2 - 5n + 1 \rightarrow \begin{cases} \frac{-b}{2a} = \frac{5}{4} \\ \frac{-\Delta}{2a} = \frac{-17}{4} \end{cases} \rightarrow R_f = \left[\frac{5}{4}, +\infty\right)$$

$$\text{ب) } y = \sqrt{-n^2+4n-5} \rightarrow \begin{cases} \frac{-b}{2a} = 2 \\ \frac{-\Delta}{2a} < 2 \end{cases} R = (-\infty, 2] \xrightarrow{\text{ارکال منفرد}} R_f = [0, 2] \quad [4]$$

$$\text{ج) } y = \sqrt{n^4 - 4n^2 + 4n + 1} \rightarrow \begin{cases} \frac{-b}{2a} = 0 \\ \frac{-\Delta}{2a} < 0 \end{cases} R = \mathbb{R} \xrightarrow{\text{ارکال منفرد}} R_f = [0, +\infty)$$

$$\text{د) } y = \log(n^2 - 4n^2 + 4n + 1) \xrightarrow{\text{ارکال منفرد}} R_f = \mathbb{R}$$

$$\text{الف) } R_f = \mathbb{R} - \left\{\frac{3}{2}\right\}$$

$$\text{ب) } \text{بزرگتر از یک} = \mathbb{R} - \{1\} \xrightarrow{\text{ارکال منفرد}} R_f = [0, +\infty) - \{1\}$$

$$\text{ج) } \frac{n^2+3+1}{\sqrt{n^2+3}} = \sqrt{n^2+3} + \frac{1}{\sqrt{n^2+3}} \xrightarrow{\text{ارکال منفرد}} R_f = \left[\frac{2}{\sqrt{3}}, +\infty\right) \quad [5]$$

$$\text{د) } \left(n^2+3 + \frac{1}{n^2+3}\right) - 4$$

$$R = \left[\frac{17}{4}, +\infty\right) \xrightarrow{\text{ارکال منفرد}} R_f = \left[\frac{1}{4}, +\infty\right)$$

$$y m^2 - y = m^2 + 1$$

$$(y-1) m^2 = y+1 \rightarrow m = \pm \sqrt{\frac{y+1}{y-1}}$$

$$\frac{y+1}{y-1} \geq 0 \Rightarrow \frac{-1}{-1} \frac{1}{-1} \frac{1}{-1}$$

$$R_f = (-\infty, -1] \cup (1, +\infty)$$

[4]

$$x=0 \rightarrow \frac{1(0)+1}{(0)-1} = \frac{1}{-1} = -1$$

$$x=+\infty \rightarrow \frac{1(+\infty)^2}{(+\infty)^2} = 1$$

و چون خروجی  
می تواند منفی شود  
خارج دایره  
می شود پس -

$$R_f = (-\infty, -1] \cup (1, +\infty)$$

$$\sin x = 1 \rightarrow \frac{1(1)+1}{1-1} = \frac{2}{0} = +\infty$$

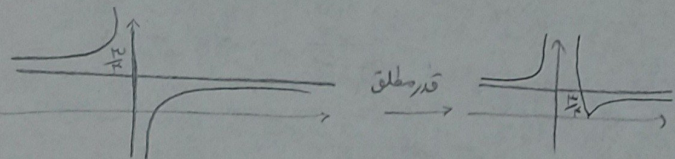
$$\sin x = -1 \rightarrow \frac{1(-1)+1}{-1-1} = \frac{0}{-2} = 0$$

خروجی می تواند مثبت  
و منفی شود

$$[-1, 1] = R_f$$

[5]

الف)  $y = \left| \frac{m^2-1}{m^2} \right|$



قد مطلق

$$R_f = [0, +\infty)$$

$$\begin{cases} m=1 \\ y=1/4 \end{cases}$$

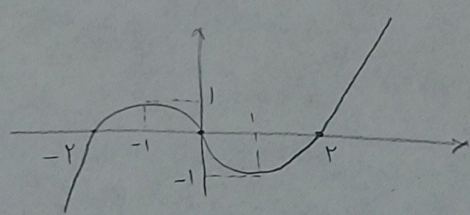
ب)  $y = \sqrt{\frac{9m-18}{5m-18}} = \sqrt{\frac{9(m-2)}{5(m-2)}} = \sqrt{\frac{9}{5}} = \frac{3}{\sqrt{5}}$

$$R_f = \left\{ \frac{3}{\sqrt{5}} \right\}$$

[6]

$$m \geq 0 \rightarrow m^2 - 2m$$

$$m < 0 \rightarrow -m^2 - 2m$$



$$R_f = \mathbb{R}$$

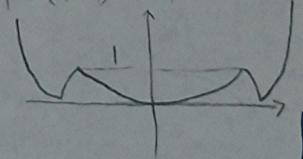
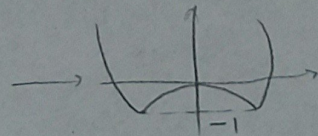
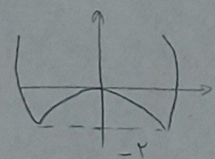
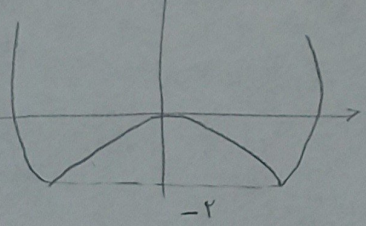
[7]

$$f(m)$$

$$f(|m|)$$

$$f(|m|) + 1$$

$$y = |f(|m|) + 1|$$



$$R_f = [0, +\infty)$$

[8]