

(کالیف ۴۰)

۱۹

(ف.ط.ش.ر.س)

(دوازدهم دفتر B)

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

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

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

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

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

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

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

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

(2) [2]

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

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

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

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

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

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

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

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

(2) [2]

$$\text{الف) } y = 2n^2 - 5n + 1 \rightarrow \begin{cases} \frac{-b}{2a} = \frac{5}{4} \\ \frac{\Delta}{4a} = \frac{-11}{4} \end{cases} \rightarrow R_f = \left[\frac{-11}{4}, +\infty\right) \quad \checkmark$$

$$\text{ب) } y = \sqrt{-n^2+4n-5} \rightarrow \begin{cases} \frac{-b}{2a} = 2 \\ \frac{\Delta}{4a} = 1 \end{cases} R = (-\infty, 4] \xrightarrow{\text{از کمال منفی}} R_f = [0, 4] \quad \checkmark$$

$$\text{ج) } y = \sqrt{n^2-4n^2+7n+6} \rightarrow \begin{cases} \frac{-b}{2a} = 2 \\ \frac{\Delta}{4a} = 1 \end{cases} R = [1, 6] \xrightarrow{\text{از کمال منفی}} R_f = [0, 6] \quad \checkmark$$

$$\text{د) } y = \log(n^2-4n^2+7n+6) \xrightarrow{\text{از کمال منفی}} R_f = \mathbb{R} \quad \checkmark$$

$$\text{الف) } R_f = \mathbb{R} - \left\{\frac{11}{4}\right\} \quad \checkmark$$

$$\text{ب) } \text{از کمال منفی} = \mathbb{R} - \{4\} \xrightarrow{\text{از کمال منفی}} R_f = [0, +\infty) - \{4\} \quad \checkmark$$

$$\text{ج) } \frac{n^2+3+1}{\sqrt{n^2+3}} = \sqrt{n^2+3} + \frac{1}{\sqrt{n^2+3}} \xrightarrow{\text{از کمال منفی}} R_f = \left[\frac{1}{\sqrt{3}}, +\infty\right) \quad \checkmark$$

(2) [2]

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

$$R = \left[\frac{11}{4}, +\infty\right) \xrightarrow{\text{از کمال منفی}} R_f = \left[\frac{1}{4}, +\infty\right) \quad \checkmark$$

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

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

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

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

(2) [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 خروج
می تواند منفی شود
خارج دو بازه
می شود جدا

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

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

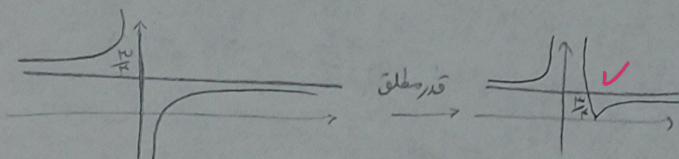
$$\sin x = -1 \rightarrow \frac{1(-1)+1}{-1-1} = \frac{0}{-2} = 0$$

خروج می تواند مثبت
و منفی شود

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

(2) [5]

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



قد مطلق

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

$$\left| \frac{m-1}{m} \right| = 1$$

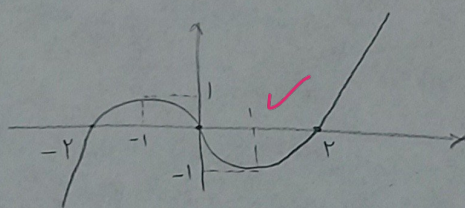
$$\text{ب) } y = \sqrt{\frac{9m-18}{5m-18}} = \sqrt{\frac{9(m-2)}{5(m-2)}} = \sqrt{\frac{9}{5}} = \frac{3}{\sqrt{5}}$$

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

(2) [8]

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

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



$$R_f = R$$

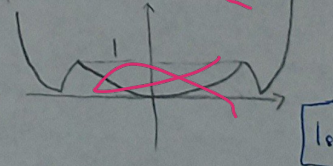
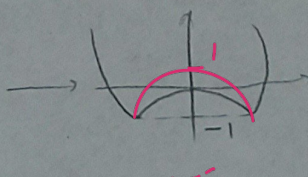
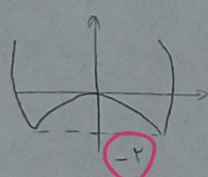
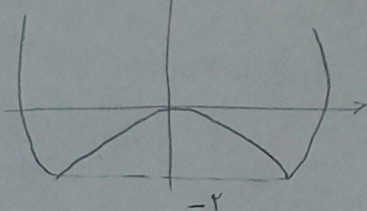
(2) [9]

$$f(m)$$

$$f(|m|)$$

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

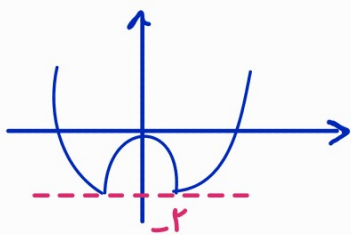
$$y = |f(|m|) + 1|$$



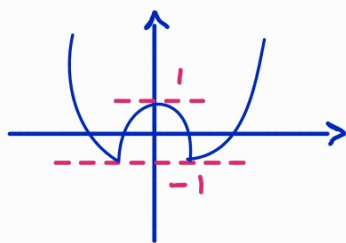
$$R_f = [0, +\infty)$$

(1)

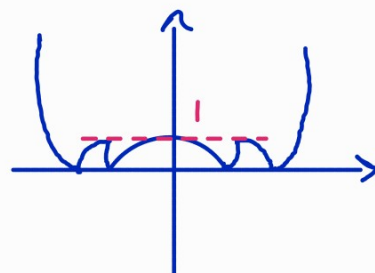
[10]



$$y = f(|x|)$$



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



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