

الف) $(9, x+2y), (3x-y, -4) \Rightarrow \begin{cases} 3x-y=9 \rightarrow 4x-2y=18 \\ x+2y=-4 \end{cases} \Rightarrow \begin{cases} 4x-18=-x-4 \\ 5x=14 \rightarrow x=2.8 \rightarrow y=-3.2 \end{cases}$

$\frac{x}{y} = -\frac{1}{3}$

ب) $(-1, -3), (\frac{1}{x} - \frac{1}{y}, \frac{5}{x} - \frac{1}{y}) \Rightarrow \frac{y-x}{xy} = -1 \Rightarrow \frac{y-5x}{xy} = -3 \Rightarrow 3xy = 5y - 3x$
 $\Rightarrow 3y - 3x = 5y - 3x \Rightarrow 2y = 2x \Rightarrow y = x$
 $\frac{5y-17x}{xy} = -3 \Rightarrow -3xy = 5y - 17x$
 $\frac{x}{y} = \frac{x}{2x} = \frac{1}{2}$

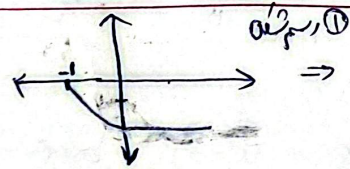
$f = \{(a, 2a), (1, a+1), (1, -2), (2, b)\} \Rightarrow f = \{(2, -2), (1, -2), (2, b)\}$
 $f(a) + 2f(2) = 2f(1) \Rightarrow -4 + 2b = -4 \Rightarrow b = 0$

$f = \{(-1, m^2-3m), (-1, 2), (2, 5), (2, 4), (m+1, 2), (m^2+2, 4m+1)\}$
 $m^2-3m = 2 \Rightarrow m^2-3m+2=0 \Rightarrow (m-1)(m-2)=0 \Rightarrow \begin{cases} m=1 \\ m=2 \end{cases}$
 $m=1 \Rightarrow (m+1, 2) = (2, 2) \Rightarrow \text{غیر قابل تمیز}$
 $m=2 \Rightarrow (2, 4) \Rightarrow \text{غیر قابل تمیز}$

هیچ مقدار از m قابل تمیز نیست

الف) تابع x ب) تابع y ج) تابع x د) تابع y

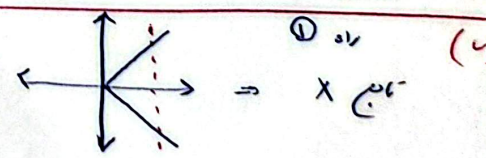
الف) $y = -\sqrt{x+1}$



ب) $x = \frac{y}{\sqrt{1-y^2}} \Rightarrow x=1 \Rightarrow \sqrt{1-y^2} = y \Rightarrow |1-y^2| = y^2$

$y^2 - 1 = y^2 \Rightarrow -1 = 0 \Rightarrow \text{غیر قابل تمیز}$
 $1 - y^2 = y^2 \Rightarrow 1 = 2y^2 \Rightarrow y^2 = \frac{1}{2} \Rightarrow y = \pm \frac{1}{\sqrt{2}} \Rightarrow \text{تابع x}$

الف) $|y| = x \Rightarrow x=1 \Rightarrow y = \pm 1 \Rightarrow \text{تابع x}$



ب) $x^3 + 3y^2 + 3y + x^3 + x = 0 \Rightarrow y_1^3 + 3y_1^2 + 3y_1 = y_2^3 + 3y_2^2 + 3y_2$
 $(y_1 - y_2)(y_1^2 + y_2^2 + y_1 y_2) = 3(y_2 - y_1)(y_2 + y_1) + 3(y_2 - y_1)$

$(y_1 - y_2)(y_1^2 + y_2^2 + y_1 y_2) = 3(y_2 - y_1)(y_2 + y_1 + 1)$
 $(y_1 - y_2)(y_1^2 + y_2^2 + y_1 y_2 + 3y_2 + 3y_1 + 3) = 0$
 $(y_1 - y_2)(y_1^2 + y_2^2 + y_1 y_2 + 3y_2 + 3y_1 + 3) = 0 \Rightarrow y_1 - y_2 = 0 \Rightarrow y_1 = y_2$

ب) $y_1^2 + y_1(y_2+3) + y_2^2 + 3y_2 + 3 = 0$
 $\Delta = (y_2+3)^2 - 4(y_2^2 + 3y_2 + 3) = y_2^2 + 4y_2 + 9 - 4y_2^2 - 12y_2 - 12 = -3y_2^2 - 8y_2 - 3 = 0$

$$-r y_r - r y_r - r = -r (y_r + r y_r + 1) = -r (y_r + 1)^r \Rightarrow \Delta \leq 0$$

$$\Delta < 0 \Rightarrow y_1 = y_r \text{ (Unique)}$$

$$\Delta = 0 \Rightarrow y_r = -1 \xrightarrow{\text{check}} y_r^r + r y_r + 1 = 0 \Rightarrow (y_r + 1)^r = 0 \Rightarrow y_r = -1 \Rightarrow y_1 = y_r \} \Rightarrow \checkmark$$

$$f(x) = \frac{x^r + r x + 1}{x^r + \epsilon x + 1} = \frac{(x+r)^r + 1}{(x+r)^r + 1} = \frac{r+1}{r+1} = \epsilon = \boxed{\frac{r}{r}}$$

$$f(x) = x^r \tan x + b \quad \left. \begin{array}{l} (-1, -\epsilon) \\ y = x - a \end{array} \right\} \begin{array}{l} -\epsilon = -1 - a + b \Rightarrow b = -r \\ -2 - a = -\epsilon \Rightarrow a = 1 \end{array} \quad (1)$$

$$x^r + x - r = r x - 1 \Rightarrow x^r - \underbrace{r x}_{-r x} - 1 = 0 \quad x(x-1)(x+1) - (x+1) = 0$$

$$\underbrace{(x+1)}_{n=-1} (x^r - x - 1) = 0 \Rightarrow x^r - x - 1 = 0 \rightarrow \text{دو جواب این معادله است} \Rightarrow \text{و جواب دیگر} = -\frac{b}{a} = \boxed{1}$$

$$f = \{(r, a+b), (1, a), (-1, a-rb+1)\} \rightarrow \text{بجای}$$

$$a+b = r a \Rightarrow b = a \Rightarrow a - rb + 1 = r a \Rightarrow -a + 1 = r a \Rightarrow \boxed{a = \frac{1}{r}} \quad b = \frac{1}{r}$$

$$f(x) = \frac{\epsilon x^r - a x + c + 1}{b x + r} \rightarrow \text{بجای} \quad \frac{\epsilon x^r - a x + c + 1}{b x + r} = x$$

$$(\epsilon + 1) x^r - (a+r) x + c + 1 = 0 \Rightarrow c = -1 \quad a = -r \quad b = r \quad \boxed{a+b+c=0}$$

$$\frac{\epsilon x^r + r x}{\epsilon x + r} = x \rightarrow \text{الیه رسیدی آن است} \Rightarrow D_f = \mathbb{R} - \left\{ \frac{r}{\epsilon} \right\}$$