

۱۸،۵

الف) $(9, x+2y), (3x-y, -4)$ $\begin{cases} 3x-y=9 \\ x-3 \rightarrow x+2y=-4 \end{cases} \Rightarrow \begin{cases} 3x-y=9 \\ -3x-6y=12 \end{cases} \Rightarrow -7y=21 \Rightarrow y=-3, x=2$

$\frac{x}{y} = \frac{2}{-3}$

$\frac{1}{x} - \frac{1}{y} = -1 \xrightarrow{x-xy} y-x = xy$

ب) $(-1, -3), (\frac{1}{x} - \frac{1}{y}, \frac{5}{x} - \frac{y}{y})$ $\frac{5}{x} - \frac{y}{y} = -3 \xrightarrow{x-xy} vx - 5y = 3xy$ ۱،۵

$\Rightarrow \begin{cases} 3xy - 3x = 3xy - 3x \\ vx - 5y = 3xy - 3x \end{cases} \Rightarrow 10x = 14y \rightarrow \frac{x}{y} = \frac{7}{5} = \frac{1}{5}$

$f = \{(a, 2a), (1, a+1), (1, -2), (2, b)\}$ $a+1 = -2 \Rightarrow a = -3$

$f = \{(-3, -6), (1, -2), (2, b)\}$

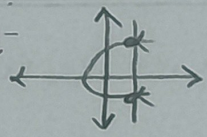
$f(a) + 2f(2) = 3f(1) \Rightarrow -6 + 2b = -6 \Rightarrow 2b = 0 \Rightarrow b = 0$ ۲

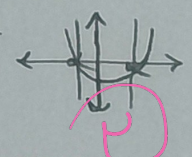
$f = \{(-1, m^2 - 3m), (3, 5), (-1, -2), (m+1, 4), (2, 4), (m^2+2, 4m+1)\}$

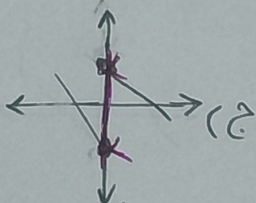
$m^2 - 3m = -2 \rightarrow m^2 - 3m + 2 = 0 \Rightarrow (m-1)(m-2) = 0 \Rightarrow m=1, m=2$ ۱،۵

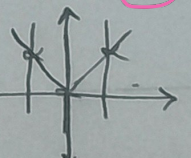
① $m=1 \Rightarrow (m+1, 4) \rightarrow (2, 4) / (m^2+2, 4m+1) \rightarrow (3, 5) \checkmark X$

② $m=2 \Rightarrow (m+1, 4) \rightarrow (3, 4) \overline{OGG} \quad \underline{m=1} X$

الف) تابع نسبت چون خط عمود را در دو جا قطع می کند 

ب) تابع هست 

ج) تابع نسبت چون خط عمود را در دو جا قطع می کند 

د) تابع هست 

الف) $y = -\sqrt{x+1} \rightarrow \begin{cases} y_1 = -\sqrt{x+1} \\ y_2 = -\sqrt{x+1} \end{cases} \Rightarrow y_1 = 1/2 \rightarrow$ تابع هست ۳

ب) $x = \frac{y}{\sqrt{1-y^2}} \xrightarrow{x=2} 2 = \frac{y}{\sqrt{1-y^2}} \Rightarrow 4 = \frac{y^2}{1-y^2} \Rightarrow 4 - 4y^2 = y^2 \Rightarrow$ ۱،۵

$4 = 5y^2 \Rightarrow \frac{4}{5} = y^2 \Rightarrow y = \pm \frac{2}{\sqrt{5}}$ تابع نسبت

الف) $|y| = x \xrightarrow{x=1} |y| = 1 \Rightarrow y = \pm 1 \rightarrow$ تابع نسیب ✓

ب) $y^3 + 3y^2 + 3y + x^3 + x = 0 \rightarrow (y+1)^3 - 1 + x^3 + x = 0 \Rightarrow (y+1)^3 = 1 - x^3 - x \Rightarrow$

$y = \sqrt[3]{1-x^3-x} - 1$ $\begin{cases} y_1 = \sqrt[3]{1-x^3-x} - 1 \\ y_2 = \sqrt[3]{1-x^3-x} - 1 \end{cases} \Rightarrow y_1 = y_2 \rightarrow$ تابع هست ✓

$f(x) = \frac{x^r + rx + a}{x^r + rx + x} \rightarrow \frac{(\sqrt{3}-r)^r + r(\sqrt{3}-r) + a}{(\sqrt{3}-r)^r + r(\sqrt{3}-r) + r} = \frac{9 - r\sqrt{3} + r + r\sqrt{3} - r + a}{9 - r\sqrt{3} + r + r\sqrt{3} - r + r} =$

$\frac{1}{12} = \frac{a}{9}$ ✓

1/12 ✓

$f(-1) = -r \Rightarrow (-1)^r + a(-1) + b = -r \Rightarrow b = -r + a$

$f(x) = rx - a \Rightarrow x^r + ax + b = rx - a \xrightarrow{b = -r + a} x^r + ax + (-r + a) = rx - a \Rightarrow$

$x^r + ax - rx - r + a + a = 0 \Rightarrow x^r + (a-r)x + (2a-r) = 0 \xrightarrow{x=-1}$ ریشه اول ✓

$(-1)^r + (a-r)(-1) + (2a-r) = 0 \Rightarrow (-1 + r - r) + (-a + 2a) = 0 \Rightarrow -1 + a = 0 \rightarrow a = 1$

$b = -r + a \rightarrow b = -r$ $x^r + (a-r)x + (2a-r) = 0 \xrightarrow{a=1, b=-r} x^r - rx - 1 = 0 \div x+1 \rightarrow$

$(x+1)(x^r - x - 1) = 0 \rightarrow x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(-1)}}{2(1)} \rightarrow x_1 = \frac{1+\sqrt{5}}{2}, x_2 = \frac{1-\sqrt{5}}{2} \rightarrow x_1 + x_2 = \frac{1+\sqrt{5}+1-\sqrt{5}}{2} = 1$

$f = \{(r, a+b), (1, 2a), (-1, a-rb+1)\}$ تابع نسیب است $\Rightarrow \begin{cases} a+b = 2a \Rightarrow b = a \\ a - rb + 1 = 2a \Rightarrow \\ a - 2a + 1 - 2a = 0 \Rightarrow \\ -3a = -1 \Rightarrow a = \frac{1}{3} \end{cases}$ ✓

$\frac{rx^r - ax + c + 1}{bx + r} = x \xrightarrow{xbx+r} rx^r - ax + c + 1 = bx^r + rx$ ضرایب تمام توان های x باید برابر باشند

① $r-b = 0 \rightarrow b = r$ ضرایب x^r

② $-a - r = 0 \rightarrow a = -r$ ضرایب x

③ $c+1 = 0 \rightarrow c = -1$ ضرایب ثابت

$a+b+c = -r + r - 1 = -1$ ✓

ب-۱

$$\int \frac{1}{x} - \frac{1}{y} = -1 \xrightarrow{x=\omega} \int \frac{-\omega}{x} + \frac{y}{y} = \Delta$$

$$\left[\frac{\omega}{x} - \frac{y}{y} = -\mu \right] \rightarrow \frac{-\omega}{x} - \frac{y}{y} = -\mu \rightarrow \frac{-\omega}{x} = 2 \rightarrow \boxed{y = -1}$$

$$\text{if } y = -1 \rightarrow \frac{1}{x} + 1 = -1 \rightarrow \frac{1}{x} = -2 \rightarrow \boxed{x = -\frac{1}{2}} \rightarrow \frac{x}{y} = +\frac{1}{2}$$

$$f = \int (-1, m^2 - 3m) (3, \Delta) (-1, -2) (m+1, 4) (2, \varepsilon) (m^2 + 2, \varepsilon_{m+1})$$

$$(-1, m^2 - 3m), (-1, -2) \rightarrow m^2 - 3m + 2 = 0 \rightarrow m = 2$$

$$\rightarrow m = 1$$

-۳

$$m=1 \rightarrow (2, \varepsilon) (m+1, 4) \rightarrow (2, \varepsilon) (2, 4) \times$$

$$m=2 \rightarrow (3, \Delta) (m+1, 4) \rightarrow (3, \Delta) (3, 4) \times$$

به ازای صمیم مقدار m جواب
تفاوت در است!

$$x = \frac{y}{\sqrt{1-y^2}} \rightarrow \frac{y_1}{\sqrt{1-y_1^2}} = \frac{y_2}{\sqrt{1-y_2^2}} \rightarrow \frac{y_1^2}{1-y_1^2} = \frac{y_2^2}{1-y_2^2}$$

۵

ب

$$\rightsquigarrow y_1^2 - y_1^2 y_2^2 = y_2^2 - y_1^2 y_2^2 \xrightarrow{y_1, y_2} y_1 = y_2 \rightarrow \text{رابطه تابعیت}$$

$$f(n) = \frac{x^2 + 4n + \Delta}{n^2 + 2n + 7} = \frac{x^2 + 4n + 4 + 1}{n^2 + 2n + 4 + 3} = \frac{(n+2)^2 + 1}{(n+2)^2 + 3}$$

۷

$$f(\sqrt{3}-2) = \frac{(\sqrt{3}-2+2)^2 + 1}{(\sqrt{3}-2+2)^2 + 3} = \frac{4}{4} = \left(\frac{2}{2}\right)$$