

الف)  $(9, 2y), (2x-y, -4)$

$3x - y = 9 \xrightarrow{x=2} 4x - 2y = 18$   
 $x + 2y = -4$   
 $\forall x \geq 1 \Rightarrow x \geq 2 \Rightarrow y = -2$

بارسا سامی تالیف ۲۷ = ۱۹, ۷۵  
 $\frac{x}{y} = -\frac{2}{3}$  ✓ (۱)  
 $\frac{x}{y} = -\frac{2}{3}$  ✓ (۱)

ب)  $(-1, -3), (\frac{1}{x} - \frac{1}{y}, \frac{5}{x} - \frac{y}{y})$

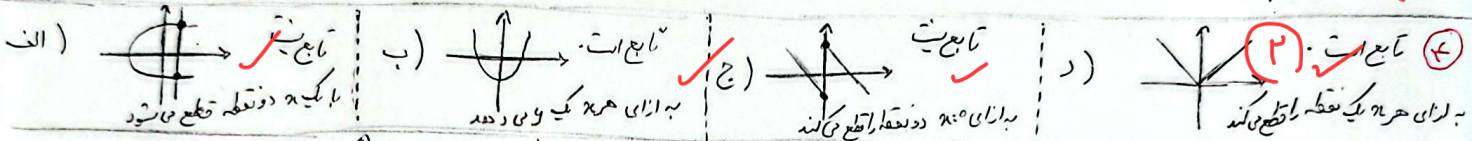
$\frac{1}{x} - \frac{1}{y} = -1 \xrightarrow{x=2} -\frac{2}{2} + \frac{5}{y} = 5$   
 $\frac{5}{x} - \frac{y}{y} = -2$   
 $-\frac{2}{y} = 2 \Rightarrow y = -1$   
 $\frac{x}{y} = \frac{2}{-1} = -2$   
 $x = -1$   
 رفت!  $x = -1$   
 $\frac{x}{y} = \frac{1}{-1} = -1$  (۲)

$f = \{(a, 2a), (1, a+1), (1, -2), (2, b)\}$   
 $a+1 = -2 \Rightarrow a = -3 \Rightarrow (-3, -4)$

$f(a) + 2f(2) = 3f(1) \Rightarrow -4 + 2b = -4 \Rightarrow b = 0$  ✓ (۲) (۲)

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

$m = 2 \times \Rightarrow f(m+1) \neq f(2)$  ✓ (۲) (۳)  
 $m = 1 \times \Rightarrow f(m+1) \neq f(2)$  ✓ (۲) (۳)



الف)  $y = -\sqrt{x+1}$   
 تابع است. ✓

ب)  $x = \frac{y}{\sqrt{1-y^2}} \xrightarrow{x=1} \sqrt{1-y^2} = y \Rightarrow 1-y^2 = y^2 \Rightarrow 2y^2 = 1 \Rightarrow y^2 = \frac{1}{2} \Rightarrow y = \pm \frac{1}{\sqrt{2}}$   
 تابع نیست. ✓ (۲) (۵)

الف)  $|y| = x \Rightarrow x = 2, y = \pm 2$   
 تابع نیست. ✓

ب)  $y^3 + 3y^2 + 3y + x^3 + x = 0 \xrightarrow{\pm 1} (y+1)^3 = -x^3 - x + 1$   
 $y+1 = \sqrt[3]{-x^3 - x + 1} \Rightarrow y = \sqrt[3]{-x^3 - x + 1} - 1$   
 if  $x_1 = x_2 \Rightarrow \begin{cases} y_1 = \sqrt[3]{-x^3 - x + 1} - 1 \\ y_2 = \sqrt[3]{-x^3 - x + 1} - 1 \end{cases} \Rightarrow y_1 = y_2$   
 تابع است. ✓ (۲) (۶)

$f(x) = \frac{x^2 + 3x + 5}{x^2 + 4x + 7} = \frac{(x+2)^2 + 1}{(x+2)^2 + 3}$

$f(\sqrt{3}-2) = \frac{(\sqrt{3}-2)^2 + 1}{(\sqrt{3}-2)^2 + 3} = \frac{4}{4} = \frac{2}{2} = 1$  ✓ (۲) (۷)

$f(x) = x^2 + ax + b \xrightarrow{(-1, -4) \in \text{graph}} -f = -1 + -1 + b \Rightarrow b = -2$   
 $y = x^2 + ax + a = 0 \Rightarrow y = x^2 - a \xrightarrow{(-1, -4) \in \text{graph}} -f = -1 - a \Rightarrow a = 1$

$x^2 + x - 2 = 3x - 1 \Rightarrow x^2 - 2x + 1 = 0$   
 $\frac{-x^2 - 2x - 1}{x^2 + x} \cdot \frac{x+1}{x^2 - x - 1}$   
 $\frac{-x^2 - 2x - 1}{-x^2 - x}$   
 $\frac{-x - 1}{-x - 1}$   
 $\frac{-x - 1}{-x - 1} = 1$  (۲) (۸)

$x^2 - x - 1 = 0 \Rightarrow s = -\frac{b}{a} = -\frac{-1}{1} = 1 \Rightarrow$  جمع طول ها ✓

$a+b = 2a \Rightarrow a = b$       $a - 2a + 1 = 2a \Rightarrow a = \frac{1}{3}$  ✓ (۲) (۹)

$f(x) = \frac{fx^2 - ax + c + 1}{bx + 3}, f(x) = x \Rightarrow bx^2 + 3x = fx^2 - ax + c + 1 \Rightarrow b = f, a = -3, c = -1$   
 $a + b + c = 0$  ✓ (۲) (۱۰)