

آینا مشرقی

الف) $(9, x+2y)$, $(12x-y, -4)$ (1)

$x+2y = -4 \rightarrow x = -4-2y$

$12x-y = 9 \quad (-4-2y) \times 12 - y = 9$

$-12-4y-y = 9$

$-13y = 9+12 = 21 \rightarrow y = -\frac{21}{13}$

$x = -4 - 2(-\frac{21}{13}) = \frac{10}{13}$

$\frac{x}{y} = \frac{10}{-21}$

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

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

$-xy = y-x$

$xy - vx = 3y - 3x$

$xy = 3x$

$y = 3x$

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

$-xy = y-x \rightarrow -x(3x) = 3x-x$

$\frac{xy-vx}{x} = y-x$

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

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

$-2x = 1$
 $x = -\frac{1}{2}$

$y = 3x = \frac{3}{2} \times -\frac{1}{2} = -\frac{3}{2}$

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

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

$a+1 = -2$
 $a = -3$

(2)

$f(a) + 2f(1) = 3f(1)$

$2a + 2 \times b = 3 \times (a+1)$

$-6 + 2b = -6 \rightarrow b = 0$

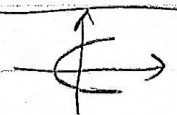
$f = \{(-1, m^2 - 3m), (\frac{1}{m}, 1), (-1, -2), (\frac{m+1}{m}, y), (\frac{1}{m}, m), (m^2+2, 2m+1)\}$


$m^2 - 3m = -2 \rightarrow \frac{m(m-3)}{1} = -2$
 $m = 2$
 $m = 1$

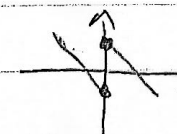
$m+1 \neq 2$
 $m \neq 1$

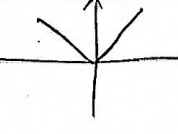
$m+1 \neq 3$
 $m \neq 2$

m, 1, 2 صحیح جوابات

الف)  $x = y^2$

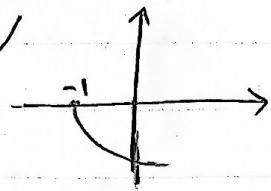
ب)  $y = x^2 - 1$

ج)  $y = |x|$

د)  $y = |x|$

1, 1 صحیح جوابات

الف) $y = -\sqrt{x+1} \rightarrow y^2 = -x+1 \checkmark$



(15)

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

$x_1 = \frac{y_1}{\sqrt{1-y_1^2}}, x_2 = \frac{y_2}{\sqrt{1-y_2^2}} \rightarrow x_1 = x_2 \rightarrow \frac{y_1}{\sqrt{1-y_1^2}} = \frac{y_2}{\sqrt{1-y_2^2}} \rightarrow y_1 = y_2$

الف) $|y| = x$ X تابع نیست

اگر $x = 2 \rightarrow y = \pm 2$

ب) $y^3 + 3y^2 + 3y + x^3 - x = 0 \checkmark$
 $y^3 \oplus y \checkmark$

$y_1^3 + 3y_1^2 + 3y_1 = y_2^3 + 3y_2^2 + 3y_2 \checkmark$

(16)

$f(x) = \frac{x^2 + 15x + 10}{x^2 + 15x + 10}$

$f(\sqrt{15} - 2) =$

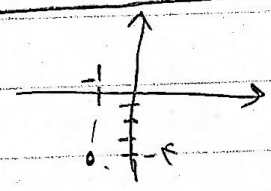
$\hookrightarrow \frac{(x+2)^2 + 1}{(x+2)^2 + 15}$

$\frac{(\sqrt{15})^2 + 1}{(\sqrt{15})^2 + 15} = \frac{16}{20} = \frac{4}{5}$

(17)

$f(x) = x^3 + ax + b$

$y - 3x + a = 0$



$-3 = -3(-1) + a \rightarrow a = -6$

$y = x^3 - 6x + b$
 $-3 = -1 - 6(-1) + b$
 $b = -10$

$f(x) = y \rightarrow x^3 - 6x + 10 = -3x - 10$

$x^3 - 3x - 10 = (x+1)(x^2 - 2x - 10) = 0$

$x = -1$

$\frac{1 \pm \sqrt{41}}{2}$

مجموعه = $\frac{1 + \sqrt{41} + 1 - \sqrt{41}}{2} = 1$

SAT SUN MON TUE WED THU FRI SAT

$$a + b = 2a \implies b = a$$

(9)

$$a - 2b + 1 = a - 2a + 1 = -a + 1 \implies a = \frac{1}{2}$$

$$f(x) = \frac{2ax^2 - ax + c + 1}{bx + 2}$$

(10)

$$x = y = 1 \implies \frac{2a - a + c + 1}{b + 2} = 1 \implies \begin{cases} -a + c = b + 2 \\ c - a - b = -2 \end{cases}$$

$$x = y = 2 \implies \frac{4a - 2a + c + 1}{2b + 2} = 2 \implies \begin{cases} 2a - 2a + c = 4b + 4 \\ -2a + c - 4b = -4 \end{cases}$$

$$x = y = 3 \implies \frac{6a - 3a + c + 1}{3b + 2} = 3 \implies \begin{cases} 3a - 3a + c = 9b + 9 \\ -3a + c - 9b = -9 \end{cases}$$

$$-2 + a + b = -4 + 2a + 2b \implies a + 2b = 2$$

$$c - 2a - 4b = c - 3(2 - 2b) - 4b = c - 6 + 6b - 4b = c - 2b = -6$$

$$\begin{aligned} \implies a + b &= 1 & \implies a &= -2 & , & b &= 3 & & c &= -6 \\ a + b + c &= 0 & & & & & & & & \end{aligned}$$