

الف) $(9, x+2y), (3x-y, -4)$ $a = 3\lambda - y \rightarrow \begin{cases} 18 = 4\lambda - 2y \\ -4 = \lambda + 2y \end{cases}$ $\lambda = 2$ $\frac{\lambda}{y} = \frac{2}{-2} = -1$

ب) $(-1, -3), (\frac{1}{x} - \frac{1}{y}, \frac{5}{x} - \frac{y}{y})$
 $\begin{cases} \frac{1}{x} - \frac{1}{y} = -1 \\ \frac{5}{x} - \frac{y}{y} = -3 \end{cases} \rightarrow \frac{5}{x} - \frac{1}{y} = -3$
 $\frac{1}{x} + 1 = -1 \rightarrow \frac{1}{x} = -2 \rightarrow -2\lambda = 1 \rightarrow \lambda = -\frac{1}{2}$
 $\frac{\lambda}{y} = \frac{-\frac{1}{2}}{-1} = \frac{1}{2}$

$f = \{(a, 2a), (1, a+1), (1, -2), (2, b)\}$
 $a+1 = -2 \rightarrow a = -3$
 $f(a) + 2f(2) = 3f(1)$
 $f(-3) + 2f(2) = 3f(1)$
 $-4 + 2(b) = 3(-2)$
 $-4 + 2b = -6 \rightarrow 2b = -2 \rightarrow b = -1$

$f = \{(-1, m^2 - 3m), (3, 5), (-1, -2), (m+1, 6), (2, 4), (m^2 + 2, 4m + 1)\}$
 $m^2 - 3m = -2 \rightarrow m^2 - 3m + 2 = 0 \rightarrow (m-1)(m-2) = 0 \rightarrow m = 1, 2$
 $\frac{c}{a} = \frac{4}{1} = 4 \rightarrow (m+1, 4) \rightarrow (2, 4) \alpha$

الف) $y = -\sqrt{x+1}$ تابع هست.

ب) $x = \frac{y}{\sqrt{1-y^2}}$ $x(\sqrt{1-y^2}) = y \rightarrow x^2(1-y^2) = y^2 \rightarrow x^2 - x^2y^2 = y^2 \rightarrow x^2 = y^2(1+x^2) \rightarrow y^2 = \frac{x^2}{1+x^2} \rightarrow y = \pm \frac{x}{\sqrt{1+x^2}}$ تابع هست.

ج) $y = x$ تابع هست.

د) $y = x^2$ تابع هست.

ه) $y = \sqrt{x}$ تابع هست.

الف) $|y| = x \rightarrow x \geq 0 \rightarrow |y| = x \rightarrow y = \pm x$ تابع نیست.

ب) $y^3 + 3y^2 + 3y + x = g^3 + 3g^2 + 3g + x = g^3 + 3g^2 + 3g + x$
 $(g_1 - g_2)(g_1^2 + g_1g_2 + g_2^2) + 3(g_1 - g_2)(g_1 + g_2) + 3(g_1 - g_2) = 0$
 $(g_1 - g_2)(g_1^2 + g_1g_2 + g_2^2 + 3g_1 + 3g_2 + 3) = 0$
 $(g_1 - g_2)(g_1^2 + g_1g_2 + g_2^2 + 3g_1 + 3g_2 + 3) = 0$

$f(x) = \frac{x^2 + 4x + 5}{x^2 + 4x + 7} \rightarrow \frac{(\sqrt{x-2})^2 + 4(\sqrt{x-2}) + 5}{(\sqrt{x-2})^2 + 4(\sqrt{x-2}) + 7} = \frac{3 + 4\sqrt{x-2} + 5 - 1 + 5}{3 + 4\sqrt{x-2} + 5 - 1 + 7} = \frac{7 + 4\sqrt{x-2}}{10 + 4\sqrt{x-2}} = \frac{7}{10}$

$f(\sqrt{x-2})$

$f(x) = x^2 + ax + b$ $y = 3x + a = 0$
 $f(-1) = (-1)^2 - a + b = -1 \rightarrow -1 - a + b = -1 \rightarrow b = a$
 $x^2 + ax + b = 3x - a$
 $x^2 + (a-3)x + (b+a) = 0$
 $(-1)^2 + (a-3)(-1) + (b+a) = 0 \rightarrow 1 - a + 3 + b + a = 0 \rightarrow 4 + b = 0 \rightarrow b = -4$
 $a = b = -4$
 $x^2 - 7x - 4 = 0 \rightarrow x = \frac{7 \pm \sqrt{49 + 16}}{2} = \frac{7 \pm \sqrt{65}}{2}$

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

$$f(x) = \frac{fx^2 - ax + c + 1}{bx + 3} \rightarrow \frac{bx^2 + 3x = fx^2 - ax + c + 1}{bx + 3}$$

$$\begin{aligned} b &= f \\ -a &= 3 \rightarrow a = -3 & a + b + c = -1 - 3 + f = 0 \\ c + 1 &= 0 \rightarrow c = -1 \end{aligned}$$