

11) (1, 2, 3)

12) (1, 2, 3)

13) (1, 2, 3)

$$1) (9, x+2y), (3x-y, -4)$$

(1)

$$2x+3x-y=9 \quad 4x-2y=18$$

$$\frac{x}{y} = \frac{-14}{14}$$

$$x+2y=-4 \quad 4x=18 \quad x=4.5, y=-4.5$$

$$\Rightarrow (-1, -3), \left(\frac{1}{x} - \frac{1}{y}, \frac{1}{x} - \frac{1}{y}\right)$$

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

$$\begin{aligned} x-y-x+2y &= 0 & 2y-4x+18 &= 0 & 5x-2xy & y=-1 & x=-\frac{1}{2} \\ -y+x-2xy &= 0 \end{aligned}$$

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

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

(1)

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

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

$$3a = -9 \quad a = -3 \quad \boxed{b=0}$$

$$2a + 2b = 3a + 3 \Rightarrow a - 2b = 3$$

$$f = \{(-1, m^2 - 4m), (3, 0), (-1, -2), (m+1, 4), (2, 4), (m+2, m+1)\} \quad (1^0)$$

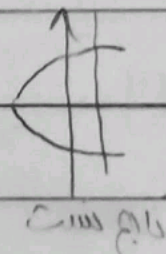
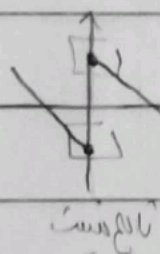
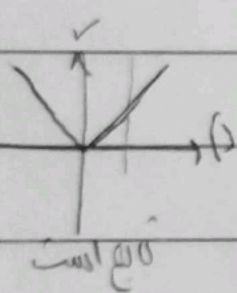
$$m^2 - 4m = -2 \quad m^2 - 4m + 2 = 0 \quad (m-1)(m-2) = 0$$

$$m \in \{1, 2\}$$

$$m=1 \quad \{(-1, -2), (3, 0), (-1, -2), (2, 4), (2, 4), (3, 0)\} \quad \text{تابع نیست}$$

$$m=2 \quad \{(-1, -2), (3, 0), (-1, -2), (3, 4), (2, 4), (4, 4)\} \quad \text{تابع نیست}$$

تفاوت در  $m$



الف)  $y = -\sqrt{x+1}$  تابع است ✓ (0)

ب)  $x = \frac{y}{\sqrt{1-y^2}}$   $x_1 = \frac{y_1}{\sqrt{1-y_1^2}}$   $x_2 = \frac{y_2}{\sqrt{1-y_2^2}}$   $x_1 = x_2 \Rightarrow \frac{y_1}{\sqrt{1-y_1^2}} = \frac{y_2}{\sqrt{1-y_2^2}}$  ✓

الف)  $|y| = x \quad x=1 \quad y = \pm 1 \times$  تابع است ✓ (4)

ب)  $y^3 + 4y^2 + 4y + x^3 + x = 0 \quad y^3 + 4y^2 + 4y + 1 + x^3 + x - 1 = 0 \quad x=0 \quad \text{تابع است} \checkmark$   
 $(y+1)^3 \quad y+1=1 \quad y=0$

$$f(x) = \frac{x^r + kx + 0}{x^r + kx + \mu} = (x+r)^r + 1 \quad (V)$$

$$f(\sqrt{\mu} - r) = \frac{(\sqrt{\mu})^r + 1}{(\sqrt{\mu})^r + \mu} = \frac{r}{\mu} = \frac{r}{\mu}$$

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

$$y = -\mu x + a = 0 \quad (-1, f) \quad (A)$$

$$-1 - a + b = -f \quad -f + \mu + a = 0 \quad \boxed{a = 1}$$

$$-r + b = -f \quad \boxed{b = -f}$$

$$y = -\mu x - 1 \quad f(x) = x^r + x - r$$

$$\begin{array}{r} x^r - r x - 1 \quad | \quad x+1 \\ -x^r - x^r \\ \hline -2x^r - x - 1 \\ -2x^r - 2x - 2 \\ \hline x + 1 \\ -x - 1 \\ \hline x + 1 \\ \hline 0 \end{array}$$

$$(x+1)(x^r - x - 1) = 0$$

$$\frac{1 + \sqrt{1+r}}{r} = \frac{1 + \sqrt{0}}{r}$$

$$\frac{1 + \sqrt{0}}{r} + \frac{1 - \sqrt{0}}{r} = \frac{r}{r} = 1$$

$$a + b = r a = a - b + 1$$

$$f = \{(r, a+b), (1, r a), (-1, a - r b + 1)\} \quad (B)$$

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

$$f(x) = \frac{F x^r - a x + (c+1)}{b x + \mu} = \frac{c+1}{x} \quad (C)$$

$$a + b + c = -\mu + r - 1 = 0$$

(10)

$$F x^r - a x + (c+1) = b x^r + \mu x$$

$$b = F \quad a = -\mu \quad c = -1$$