

(B) طاقه - هم دفتر

سوال ۱

$$y = a(x-h)^2 + k \rightarrow y = a(x+1)^2 + 9 \quad x=0, y=1 \quad 1 = a(1+1)^2 + 9 \rightarrow 1-9 = 14a$$

$$y = -2(x+1)^2 + 9$$

$$\frac{-14 = 14a}{a = -2} \quad \checkmark$$

$$y = -2(x^2+1+2x)+9 \rightarrow -2x^2-2+4x+9 = -2x^2+4x+7$$

سوال ۲

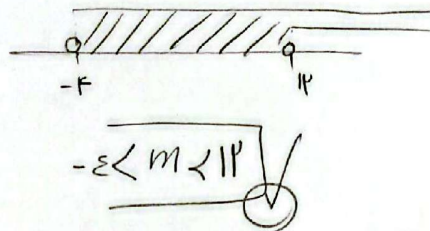
$$\Delta > 0 \rightarrow \frac{b^2 - 4ac}{4a^2} > 0$$

$$2x^2 + mx + m + 4 = 0 \rightarrow \Delta = m^2 - 4(m+4)(2) = m^2 - 8m - 32 > 0$$

$$\Delta = m^2 - 8m - 32 > 0$$

$$(m-12)(m+8) > 0$$

$$m > 12 \quad m < -8$$



$$\Delta > 0 \rightarrow \frac{b^2 - 4ac}{4a^2} > 0$$

$$\Delta = b^2 - 4ac = (2m-1)^2 - 4 \times 1 \times (2-m) = 4m^2 - 4m + 1 - 8 + 4m = 4m^2 - 4m - 7 > 0$$

سوال ۳

$$4m^2 - 4m - 7 > 0$$

$$x_1 + x_2 = \frac{-b}{a} = \frac{-(2m-1)}{4}$$

$$x_1 x_2 = \frac{c}{a} = \frac{2-m}{4}$$

$$(2m-1)(m-2) = 9$$

$$2m(m-2) - 1(m-2) = 9$$

$$2m^2 - 4m - m + 2 = 9 \rightarrow 2m^2 - 5m - 7 = 0$$

$$m = -1 \rightarrow \Delta = 4(1) - 4(-1) - 7 = 4 + 4 - 7 = 1 > 0$$

$$4m^2 - 4m - 7 > 0$$

$$4m^2 - 4m - 7 > 0$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$m_1 = \frac{5 + \sqrt{25 + 112}}{4} = \frac{5 + \sqrt{137}}{4} \quad m_2 = \frac{5 - \sqrt{137}}{4}$$

سوال ۴

$$r_1 + r_2 = (x_1^w + x_2^w) + \left(\frac{1}{x_1^r} + \frac{1}{x_2^r} \right)$$

$$(x_1 + x_2)^w - 3x_1 x_2 (x_1 + x_2) = 1 - 3(-\varepsilon)(1) = 1^w$$

$$\left. \begin{aligned} x_1 + x_2 &= \frac{-1}{\varepsilon} \\ x_1 x_2 &= \frac{-1}{\varepsilon} \end{aligned} \right\} \Rightarrow 1^w - \frac{1}{\varepsilon} = \frac{\omega^2 - 1}{\varepsilon} = \frac{\omega^2}{\varepsilon}$$

$$\left(x_1^w + \frac{1}{x_1^r} \right) \left(x_2^w + \frac{1}{x_2^r} \right) \Rightarrow x_1^w x_2^w = (\varepsilon)^w = -9\varepsilon$$

$$x_1^w \times \frac{1}{x_1^r} = x_1^p$$

$$\left. \begin{aligned} x_1^w \times \frac{1}{x_1^r} &= x_1^p \\ x_2^w \times \frac{1}{x_2^r} &= x_2^p \end{aligned} \right\} \Rightarrow -9\varepsilon + \left(\frac{x_1^p + x_2^p}{s^2 - p^2} \right) + \frac{1}{x_1 x_2} = 1 - 2(-\varepsilon) = 1 + 2\varepsilon = 9$$

$$x_1 x_2 = \frac{-2\varepsilon}{\varepsilon} = -2$$

$$\left. \begin{aligned} y^2 - (r_1 + r_2)y + (r_1 r_2) &= y^2 - \frac{\omega^2}{\varepsilon} y - \frac{2\varepsilon}{\varepsilon} \\ 4y^2 - \omega^2 y - 2\varepsilon &= 0 \end{aligned} \right\}$$

$$\left(\frac{\sqrt[r]{x^r}}{t^r} + 1\right)(\sqrt[r]{x^r} - 1) = r\sqrt[r]{x} \Rightarrow \left(t^r + \frac{1}{t^r} + 1\right)(t^r - 1) = r t^{\frac{r-1}{r}} \quad \text{سوال 5}$$

$$\left(\frac{t^r + t^r + 1}{t^r}\right) \times (t^r - 1) = r t^{\frac{r-1}{r}} \rightarrow (t^r + t^r + 1)(t^r - 1) = r t^{\frac{r-1}{r}} \rightarrow (t^r + t^r + 1)(t^r - 1)(t-1)(t+1)$$

$$(t^r + t^r + 1)(t^r - 1) = t^q - 1 \rightarrow t^q - 1 = r t^{\frac{r-1}{r}} \rightarrow t^q - 1 - r t^{\frac{r-1}{r}} = 0 \xrightarrow{t^r = m} m^r - 1 - r m = 0$$

$$\begin{cases} x_1 = 1 + \sqrt{r} \\ x_2 = 1 - \sqrt{r} \end{cases} \Rightarrow x_1 + x_2 = 1 + \sqrt{r} + 1 - \sqrt{r} = 2 \quad \checkmark$$

$$m = 1 \pm \sqrt{r}$$

$$r x_1^r - a x_1 + r = 0$$

$$\begin{cases} x_2 = r x_1 \rightarrow x_1 + x_2 = x_1 + r x_1 = r x_1 = \frac{a}{r} \\ x_1 = \frac{a}{r^2} \end{cases} \Rightarrow \begin{cases} x_1 \times x_2 = x_1 \times r x_1 = r x_1^2 = \frac{a}{r} \\ r x_1^r = \frac{a}{r} \rightarrow x_1^r = \frac{a}{r^2} \Rightarrow x_1 = \sqrt[r]{\frac{a}{r^2}} \end{cases}$$

$$\begin{cases} \frac{r}{r^2} = \frac{a}{r^2} \rightarrow a = 1 \\ \frac{-r}{r^2} = \frac{a}{r^2} \rightarrow a = -1 \end{cases} \Rightarrow 1 - (-1) = 2 \quad \checkmark$$

سوال 7

$$\begin{cases} y = a x^r + (r + r a) x \rightarrow x = 0 \\ (0, 0) \text{ is a root} \end{cases} \Rightarrow \begin{cases} x = \frac{-(r + r a)}{a} \\ -(r + r a) \geq 0 \\ r + r a \leq 0 \rightarrow a \leq -\frac{r}{r} \end{cases}$$

سوال 8

$$\begin{cases} y = x^r + a x - r \Rightarrow \frac{-b}{r a} = \frac{-a}{r} \cup \frac{1}{r} \\ y = -x^r - r x + b \Rightarrow \frac{-b}{r a} = \frac{-(-r)}{r(-1)} = -1 \cup \frac{1}{r} \end{cases} \Rightarrow \frac{-a}{r} = -1 \rightarrow -a = -r \\ a = r$$

$$\begin{cases} 1 = x_1^r + r x_1 - r \rightarrow x_1^r + r x_1 - r = 0 \rightarrow x_1 = 1 \\ x_1 = -r \\ r - r(1 - b) \geq 0 \Rightarrow r - r + r b \geq 0 \rightarrow r b \geq 0 \end{cases}$$

$$\begin{cases} b \geq 0 \rightarrow 1 = -1 - r + b \rightarrow b = 2 \\ b \geq 0 \rightarrow 1 = -r + r b \rightarrow b = 2 \end{cases}$$

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$$\left. \begin{aligned} r_1 r_2 - a r_1 + b &= 0 \\ r_1 r_2 + a r_1 - 4 &= 0 \end{aligned} \right\} \begin{aligned} r_1 &= s_1 + \omega \\ r_2 &= s_2 + \omega \end{aligned}$$

سوال 9

$$\begin{aligned} \text{J, I, I, I, I} &\Rightarrow r_1 + r_2 = \frac{a}{r} \Rightarrow (s_1 + s_2) + 1 = r_1 + r_2 \\ \text{r, r, I, I, I} &\Rightarrow s_1 + s_2 = \frac{-4}{r} = -4 \Rightarrow \frac{a}{r} + \frac{a}{r} = 1 \\ &\quad \boxed{a=1} \end{aligned}$$

$$r_1 r_2 = (s_1 + \omega)(s_2 + \omega) = s(s_2 + \omega) + \omega(s_1 + s_2 + \omega)$$

$$\frac{b}{r} = -4 + (\omega)(\frac{-4}{r}) + \omega r \xrightarrow{a=1} \omega \times (\frac{-1}{r}) = -1 \Rightarrow \frac{b}{r} = -4 - \omega = -4$$

$$\left[\frac{a \ b}{\varepsilon} \right] = \left[\frac{1 \ -4}{\varepsilon} \right] = \left[\frac{-4}{\varepsilon} \right] = \left[-1, \omega \right] = \left[-1 \right]$$

$$x^2 + 4x + m = 0$$

$$- \quad x^2 + 2x - 3m = 0$$

سوال 10

$$x^2 + 4x + m - (x^2 + 2x - 3m) = 0 \Rightarrow 2x + 4m = 0 \Rightarrow x = -2m$$

$$x^2 + 4x - x = 0 \Rightarrow x^2 + 3x = 0 \Rightarrow x(x+3) = 0 \Rightarrow x = 0 \text{ or } x = -3$$

$$\begin{aligned} x = 0 &\Rightarrow m = 0 \\ x = -3 &\Rightarrow m = 3 \end{aligned}$$

$$x^2 + 4x + 3 = 0 \Rightarrow (x+1)(x+3) = 0$$

$$x = -1, x = -3$$

$$x^2 + 2x - 9 = 0 \Rightarrow (x+3)(x-3) = 0$$

$$x = -3, x = 3$$

$$\Rightarrow |3 - (-1)| = |4| = 4$$

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