

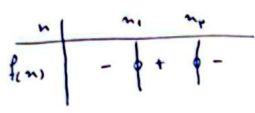
$$y = (a-1)x^2 + x + 1, \quad x = 2$$

$$x = \frac{-b}{2a} = \frac{-1}{2(a-1)} \rightarrow \frac{-1}{2(a-1)} = 2 \quad -1 = 4a - 8 \quad a = \frac{7}{4}$$

$$y = -\frac{1}{4}x^2 + x + 1 \xrightarrow{x=2} x^2 - 4x + 4 = 0 \quad \boxed{x = 4} \quad x = -2$$

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$$f(x) = mx^2 - \omega x + m$$



$$\Delta > 0 \Rightarrow 4\omega^2 - 4m^2 > 0 \Rightarrow m^2 < \frac{\omega^2}{4} \Rightarrow |m| < \frac{\omega}{2} \Rightarrow -\frac{\omega}{2} < m < \frac{\omega}{2}$$

$$\text{استنتاج} \Rightarrow \boxed{-\frac{\omega}{2} < m < \frac{\omega}{2}}$$

سوال 2

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$$\text{ریشه های معادله} \Rightarrow \frac{2-\sqrt{5}}{4}, \frac{2+\sqrt{5}}{4}$$

$$S = x_1 + x_2 = \frac{2-\sqrt{5}}{4} + \frac{2+\sqrt{5}}{4} = 1 \quad P = x_1 x_2 = \frac{2-\sqrt{5}}{4} \times \frac{2+\sqrt{5}}{4} = \frac{4-5}{16} = -\frac{1}{16}$$

$$x^2 - Sx + P = 0 \Rightarrow x^2 - x - \frac{1}{16} = 0 \xrightarrow{\times 16} 16x^2 - 16x - 1 = 0$$

سوال 3

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$$2x^2 - \alpha x + m + 1 = 0, \quad \alpha < \beta, \quad 2\alpha + \beta = 12$$

$$S = \alpha, \quad P = \frac{m+1}{2}$$

$$\alpha + \beta = 6 \Rightarrow \beta = 6 - \alpha$$

$$2\alpha + \beta = 12 \Rightarrow 2\alpha + (6 - \alpha) = 12 \Rightarrow \alpha = 6$$

$$4\alpha^2 + \alpha^2 - \alpha + 19 - 12 = 0$$

$$5\alpha^2 - \alpha + 7 = 0$$

$$5\alpha^2 - 5\alpha + 1 = 0 \Rightarrow (\alpha - 1)^2 = 0 \Rightarrow \alpha = 1$$

$$\beta = 6 - \alpha = 6 - 1 = 5$$

$$P = \alpha\beta = 5 \Rightarrow \frac{m+1}{2} = 5 \Rightarrow m = 9$$

سوال 4

سوال 5

$$S = \frac{1}{\alpha} + \frac{1}{\beta}$$

$$y = a(x-h)^2 + k \rightarrow y = a(x-2)^2 + 9$$

$$\text{(0,9)} \quad 0 = a(\omega - 2)^2 + 9$$

$$9a + 9 = 0 \rightarrow a = -1$$

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

$$y > 0 \rightarrow -(x-2)^2 + 9 > 0 \rightarrow (x-2)^2 < 9$$

$$-3 < x-2 < 3 \Rightarrow -1 < x < 5$$

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$$\alpha x^2 - \nu x + 9\beta = 0, \quad \beta > 0, \quad \frac{1}{\alpha} + \frac{1}{\beta} = ?$$

$$S = \alpha + \beta = \frac{\nu}{\alpha}, \quad P = \alpha\beta = \frac{9\beta}{\alpha} \rightarrow \alpha^2\beta = 9\beta$$

$$\beta > 0, \alpha^2 = 9 \rightarrow \alpha = \pm 3$$

$$\alpha = 3 \rightarrow 3 + \beta = \frac{\nu}{3} \rightarrow \beta = \frac{\nu}{3} - 3$$

$$\alpha = -3 \rightarrow -3 + \beta = \frac{\nu}{-3} \rightarrow \beta = \frac{\nu}{-3} + 3$$

$$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{-1}{3} + \frac{3}{\nu} = \frac{\nu}{9}$$

سوال 6

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$$2x + m\alpha - 4m = 0 \quad \alpha + \beta = 1$$

$$\alpha + m\alpha - 4m = 0$$

$$S = \alpha + \beta = -m$$

$$P = \alpha\beta = -4m$$

$$\alpha + \beta = -m\alpha + 4m$$

$$\alpha + \beta = 1 \rightarrow (-m\alpha + 4m) - m\beta = 1$$

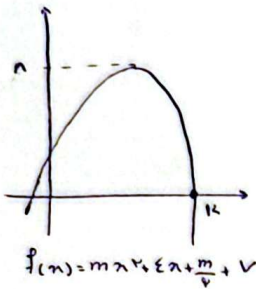
$$-m(\alpha + \beta) + 4m = 1 \rightarrow -m(-m) + 4m = 1 \rightarrow m^2 + 4m - 1 = 0$$

$$m = -4 \rightarrow \Delta < 0 \text{ قبول نمی شود}$$

$$m = 4 \rightarrow \Delta > 0 \text{ قبول می شود}$$

$$S = \alpha + \beta = -m \rightarrow S = -4$$

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$$x_s = \frac{-b}{2a} = \frac{-4}{2m} = \frac{-2}{m}$$

$$f(x_s) = m\left(\frac{-2}{m}\right)^2 + 4\left(\frac{-2}{m}\right) + 4 = 1$$

$$\frac{-4}{m} + \frac{4}{m} + 4 = 1 \rightarrow \frac{-4 + 4 + 4m}{m} = 1$$

$$m^2 - 4m - 1 = 0 \rightarrow m = 4 \rightarrow m = -4$$

برای شکل تابع همیشه منفی است پس غلط است

$$m = -4 \rightarrow -4x^2 + 4x + 4$$

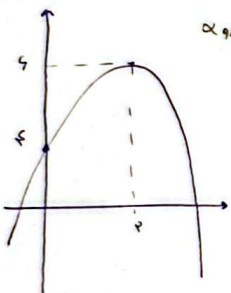
$$-4x^2 + 4x + 4 = 0$$

$$(x+1)(x-4) = 0 \rightarrow x = \frac{-4}{-1} = 4, x = \frac{4}{-4} = -1$$

ک، ریشه مثبت تابع است

سوال (۸) <

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ریشه  $\alpha, \beta$

$$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha + \beta}{\alpha\beta} = \frac{-b/a}{c/a} = -\frac{b}{c}$$

$$y = a(x-h)^2 + k \rightarrow y = a(x-4)^2 + 5$$

$$(0, 4) \rightarrow 4 = a(0-4)^2 + 5$$

$$4 = 16a + 5 \rightarrow a = -\frac{1}{16}$$

$$y = -\frac{1}{16}(x-4)^2 + 5 \rightarrow -\frac{1}{16}x^2 + \frac{1}{4}x + 4 = 0$$

$$\frac{1}{\alpha} + \frac{1}{\beta} = -\frac{b}{c} = \frac{-\frac{1}{4}}{-\frac{1}{16}} = \frac{4}{1}$$

سوال (۹) <

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$$2x - (4a+4)x + (4a^2+4a+4) = 0$$

$$\alpha, \beta \text{ ریشه}, \alpha = 4$$

$$S = \alpha + \beta = 4a + 4 \rightarrow \beta = 4a + 4$$

$$P = \alpha\beta = 4a^2 + 4a + 4 \rightarrow 4(4a+4) = 16a + 16 = 4a^2 + 4a + 4$$

$$4a^2 - 4a - 12 = 0$$

$$a^2 - a - 3 = 0 \rightarrow a = \frac{1 \pm \sqrt{13}}{2} \rightarrow a = 1$$

$$a = 1 \rightarrow 2x^2 - 8x + 12 = 0 \rightarrow x = 2 \text{ و } 3$$

$$a = -\frac{1}{4} \rightarrow 2x^2 - \frac{1}{2}x + \frac{5}{4} = 0$$

$$4x^2 - x + 5 = 0 \Rightarrow x = \left(\frac{1 \pm \sqrt{1-20}}{8}\right)$$

$$x = 4 \text{ و } \frac{1}{4}$$

سوال (۱۰) <

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