

$$y = -x^2 + bx + 3$$

-1

$$\frac{-\Delta}{2a} = V \rightarrow \frac{-b^2 + 4(-1)(3)}{-4} \rightarrow \frac{-b^2 - 12}{-4} = V \rightarrow -b^2 - 12 = -4 \rightarrow$$

3

$$-b^2 = -14 \rightarrow b^2 = 14 \rightarrow b = \pm \sqrt{14}$$

-2

الف) $f(x) = x^2 + 2x + 3$ $\frac{a^2 = t}{t^2 + 2t + 3 = 0} \rightarrow \Delta < 0$ ریشه ندارد

ب) $f(x) = (x - a)^2 - 2(x - a) - 1$ $\frac{a - a^2 = t}{t^2 - 2t - 1 = 0} \rightarrow \begin{cases} t = 1 + \sqrt{2} \\ t = 1 - \sqrt{2} \end{cases}$

$$x - a^2 = 1 \rightarrow -a^2 = 1 \rightarrow a^2 = -1$$

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$$x - a^2 = -1 \rightarrow -a^2 = -1 \rightarrow a^2 = 1 \rightarrow a = \pm 1$$

10

-3

$$\alpha(\alpha + 1)$$

$$x^2 - 14x + m = 0$$

1, 0

$$P = \frac{c}{a} = \frac{m}{-1} = \alpha(\alpha + 1) = \alpha^2 + \alpha \xrightarrow{\alpha=1} \frac{m}{-1} = 2 \rightarrow m = -2$$

$$S = \frac{-b}{a} = \frac{14}{-1} = -14 = \alpha + \alpha + 1 = 2\alpha + 1 \rightarrow 2\alpha = -15 \rightarrow \alpha = -7.5$$

15

-4

$$3x^2 - 4x + m - 1 = 0$$

$$2\alpha - \beta = 1$$

1, 0

$$\beta + \alpha = \frac{-b}{a} = \frac{4}{3} = 2 \rightarrow \alpha + \beta = 2 \rightarrow \beta = 2 - \alpha$$

$$\alpha\beta = \frac{c}{a} = \frac{m-1}{3}$$

$$3x^2 - 4x = 0 \quad \Delta > 0 \quad \checkmark$$

$$2\alpha - \beta = 1 \xrightarrow{\beta=2-\alpha} 2\alpha - (2-\alpha) = 1 \rightarrow 2\alpha - 2 + \alpha = 1 \rightarrow 3\alpha - 2 = 1 \rightarrow$$

$$3\alpha = 3 \rightarrow \alpha = 1, \beta = 2 - \alpha \xrightarrow{\alpha=1} \beta = 1$$

$$\alpha\beta = \frac{m-1}{3} = 1 \times 1 = 1 \rightarrow m-1 = 3 \rightarrow m = 4$$

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نکته

$$-m^2 + 5m + m^2 - 2 = 0 \quad \frac{1}{\alpha}, \alpha \quad -\omega$$

$$P_2 = \frac{1}{\alpha} \times \alpha = 1 \rightarrow 1 = \frac{m^2 - 2}{-m} \rightarrow -m = m^2 - 2 \rightarrow m^2 + m - 2 = 0 \quad \begin{matrix} m=1 \\ m=-2 \end{matrix}$$

$$S = \frac{1}{\alpha} + \alpha = \frac{1 + \alpha^2}{\alpha} = \frac{-5}{-2}$$

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$$\frac{m=-2}{\alpha} \rightarrow \frac{1 + \alpha^2}{\alpha} = \frac{-5}{-2} \rightarrow -2\alpha = 1 + \alpha^2 \rightarrow \alpha^2 + 2\alpha + 1 = 0 \rightarrow (\alpha + 1)^2 = 0$$

$$\alpha = -1 \quad \text{غیر صحیح} \quad \Delta$$

$$\frac{m=1}{\alpha} \rightarrow \frac{1 + \alpha^2}{\alpha} = \frac{-5}{-1} \rightarrow 1\alpha = 1 + \alpha^2 \rightarrow \alpha^2 - \alpha + 1 = 0$$

$$\Delta = 14 - 4(1)(1) = 12$$

$$\alpha_2 = \frac{1 + \sqrt{12}}{2}, \frac{1 - \sqrt{12}}{2} = \alpha \rightarrow \frac{1 + 2\sqrt{3}}{2} = 1 + \sqrt{3} = \alpha \quad \frac{1 - 2\sqrt{3}}{2} = 1 - \sqrt{3} = \alpha$$

-4

$$x^2 - mx + p = 0$$

$$\alpha\beta = p$$

$$\alpha + \beta = \frac{-b}{a} = m$$

$$\alpha\beta = \frac{c}{a} = p \rightarrow \frac{\alpha\beta}{\alpha} = \frac{p}{\alpha} \rightarrow \beta = \frac{p}{\alpha}$$

$$\alpha\beta = p, \beta = \frac{p}{\alpha} \rightarrow \frac{p}{\alpha} \times \alpha = p \rightarrow \alpha = \frac{p}{m}$$

$$m = \frac{9}{5} + \frac{5}{5} = \frac{14}{5} + \frac{14}{5} = \frac{28}{5}$$

$$x^2 - \frac{28}{5}x + 9 = 0 \quad \Delta > 0 \quad \checkmark$$

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$$2x^2 - 5x + m = 0$$

$$\alpha, \beta$$

1, 1, 5

- V

$$\alpha + \beta = -\frac{b}{a} = 5 \quad \beta = 3\alpha \rightarrow 4\alpha = 5 \rightarrow \alpha = 1$$

$$2x^2 - 5x + 3 \rightarrow \Delta = 25$$

$$\alpha\beta = \frac{c}{a} = m \rightarrow 1 \times \beta = m \quad \frac{\beta = 3\alpha}{3\alpha = 3} \rightarrow 1 \times 3 = 3 \rightarrow m = 3$$

- A

$$2x^2 - 5x + 3$$

$$\alpha^2 + \frac{1}{\alpha^2}$$

$$\alpha + \beta = 5$$

$$\alpha\beta = 3 \rightarrow \beta = \frac{3}{\alpha}$$

$$\frac{3}{\alpha} + \alpha = \alpha + \beta = 5$$

5

$$\left(\frac{3}{\alpha} + \alpha\right)^2 = \alpha^2 + \frac{1}{\alpha^2} + 6\alpha \cdot \frac{3}{\alpha} \left(\alpha + \frac{3}{\alpha}\right)$$

$$\left(\alpha + \frac{3}{\alpha}\right)^2 = \alpha^2 + \frac{1}{\alpha^2} + \frac{4\alpha}{\alpha} \left(\alpha + \frac{3}{\alpha}\right) \quad \alpha + \frac{3}{\alpha} = 5$$

$$5^2 = \alpha^2 + \frac{1}{\alpha^2} + 4 \times 5 \rightarrow 25 = \alpha^2 + \frac{1}{\alpha^2} + 20 \rightarrow$$

$$\alpha^2 + \frac{1}{\alpha^2} = 5$$

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- 9

$$h(t) = -10t^2 + 40t \quad t_{max} = -\frac{b}{2a} = -\frac{40}{-20} = 2, 40 \quad \text{ثانیه}$$

5

$$h_{max} = -10(2, 40)^2 + 40(2, 40) = -10(4, 16) + 160 = -40 + 160 = 120$$

$$40, 120 \quad \text{ثانیه}$$

$$h(t) = 0 \rightarrow -10t^2 + 40t = 0 \rightarrow t(-10t + 40) = 0$$

$$t=0 \rightarrow \text{نقطه شروع} \quad t=4 \rightarrow \text{نقطه پایان}$$

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$$\text{الف) } (n-1)^2 = 2n+1$$

$$\begin{array}{r|rr} n & 0 & 4 \\ \hline y & 1 & 9 \end{array}$$

5

$$n^2 - 2n + 1 = 2n + 1$$

$$n^2 - 4n = 0$$

$$n(n-4) = 0$$

$$n \text{ های بر خور } \Rightarrow 0, 4 \rightarrow n=0 \rightarrow y=1, n=4 \rightarrow y=9$$

$$y \text{ های بر خور } \Rightarrow 1, 9$$

$$0^2 - 2(0) + 1$$

$$4^2 - 2(4) + 1$$

$$\text{ب) } n^2 + 2n = |n+2|$$

$$y = n^2 + 2n \rightarrow n_s = \frac{-b}{2a} = \frac{-2}{2} = -1$$

$$y_s = -1$$

1

$$\begin{array}{r|rr} n & -2 & -1 & 0 \\ \hline y & 0 & -1 & 0 \end{array}$$

$$n \text{ های بر خور } \Rightarrow -2, 0 \rightarrow n=1 \xrightarrow{|1+2|} y=3, n=-2 \xrightarrow{|-2+2|} y=0$$

$$y \text{ های بر خور } \Rightarrow 0, 3$$

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