

$$y = x^2 + bx + 3 \rightarrow \max x = 7$$

$$\frac{-\Delta}{4a} = \frac{-(b^2 + 12)}{-4} = \frac{b^2 + 12}{4} = 7 \rightarrow b^2 + 12 = 28 \Rightarrow$$

$$b^2 = 16 \rightarrow b = \pm 4$$

$$الف) f(x) = x^2 + 2x + 3 \quad x = t \quad t^2 + 2t + 3 = 0 \rightarrow \Delta < 0 \rightarrow \text{حقیقی جواب ندارد}$$

$$ب) f(x) = (4 - x^2) - 2(4 - x^2) - 15 \quad t = 4 - x^2 \quad t^2 + 2t - 15 = 0 \rightarrow$$

$$4 - x^2 = 5 \Rightarrow -x^2 = 1 \Rightarrow \text{غیرممکن}$$

$$t = 5, -3$$

$$4 - x^2 + 3 = 0 \rightarrow -x^2 = -7 \rightarrow x = \pm \sqrt{7}$$

$$4x^2 - 16x + m = 0$$

$$\alpha + \beta = 4 \rightarrow \alpha + \alpha + 2 = 4 \rightarrow \alpha = 1, \beta = 3$$

$$\alpha \cdot \beta = \frac{m}{4} \rightarrow 3 = \frac{m}{4} \rightarrow m = 12$$

$$3x^2 - 6x + m - 1 = 0$$

$$\alpha + \beta = 2 \rightarrow \alpha + 2\alpha - 4 = 2 \rightarrow \alpha = 2, \beta = 0$$

$$\alpha \cdot \beta = \frac{m-1}{3} \rightarrow 0 = \frac{m-1}{3} \rightarrow m-1 = 0 \rightarrow m = 1$$

$$2\alpha - 4 = \beta$$

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

$$\alpha + \beta = \frac{4}{m}$$

$$\alpha \cdot \beta = 1, \frac{m^2 - 2}{-m} \rightarrow m^2 + m - 2 = 0 \rightarrow m = 1, -2$$

$$\checkmark \text{ if } m = 1 \rightarrow \Delta > 0 \quad \text{حقیقی}$$

$$\times \text{ if } m = -2 \rightarrow \Delta = 0 \quad \text{غیرحقیقی}$$

$$x^2 - mx + 3 = 0$$

$$\alpha + \beta = 3 \rightarrow \alpha\beta = 4 \rightarrow \alpha\beta \times \beta = 4 \rightarrow \beta = \frac{4}{\alpha}, \alpha = \frac{9}{4}$$

$$\alpha + \beta = m, \frac{4}{3} + \frac{9}{4} = \frac{16+27}{12} = \boxed{\frac{43}{12}}$$

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

$$\alpha + \beta = 4 \rightarrow 4\alpha = 4 \rightarrow \alpha = 1, \beta = 3$$

$$\alpha \cdot \beta = m \rightarrow \boxed{3 = m}$$

$$3\alpha = \beta$$

$$x^2 - 7x + 2 = 0$$

$$\alpha + \beta = 7$$

$$\alpha \cdot \beta = 2$$

$$\rightarrow \left(\alpha + \frac{2}{\alpha}\right)^3 = \alpha^3 + \frac{8}{\alpha^3} + 6\alpha + \frac{12}{\alpha}$$

$$\alpha + \beta = \alpha + \frac{\alpha \cdot \beta}{\alpha}$$

$$6\alpha + \frac{6 \cdot \alpha \cdot \beta}{\alpha}$$

$$\alpha^3 + \frac{8}{\alpha^3} = 7^3 - 42 = 343 - 42 = \boxed{301} \leftarrow 6\alpha + 6\beta = 42$$

$$h(t) = -10t^2 + 50t$$

$$\max x = \frac{-\Delta}{4a} = \frac{-(2500)}{-40} = 62.5$$

$$-10t^2 + 50t = 0 \rightarrow -t^2 + 5t = 0 \rightarrow t(-t + 5) = 0 \rightarrow \boxed{t = 0, 5}$$

$$\text{الف) } (x-1)^2 \cdot 2x+1$$

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

$$\boxed{0, 4}$$

$$\text{ب) } x^2 + 2x = (x+2)$$

$$\{ x \geq -2 \rightarrow x^2 \geq -2$$

$$x \leq -2 \rightarrow x^2 \geq 3x+2$$

$$\boxed{-2, 1}$$

بالاتر به هم دامنه