

①

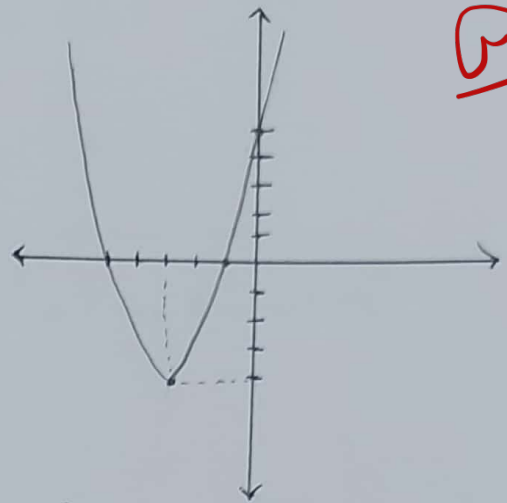
$$y = x^2 + 6x + 5 \quad a > 0 \rightarrow \text{Min}$$

$$-\frac{\Delta}{4a} \rightarrow \text{عرض سینی} \quad -\frac{b}{2a} \rightarrow \text{طول سینی}$$

$$\Delta = b^2 - 4ac \quad (6)^2 - 4(1)(5) = 16 = \Delta$$

$$-\frac{\Delta}{4a} = \frac{-16}{4(1)} = -4 \quad -\frac{b}{2a} = \frac{-6}{2(1)} = -3$$

عرض سینی طول سینی



۵

$$y = x^2 + 6x + 5 \xrightarrow{x=0} (x+1)(x+5) \Rightarrow x \begin{cases} -1 \\ -5 \end{cases} \left\{ \begin{array}{l} \text{طول از مبدأ} \\ \text{عرض از مبدأ} \end{array} \right.$$

$$x=0 \rightarrow y \rightarrow 5 \left\{ \begin{array}{l} \text{عرض از مبدأ} \\ \text{طول از مبدأ} \end{array} \right.$$

$$y = -x^2 + 4x - 3 \quad a < 0 \rightarrow \text{Max}$$

$$-\frac{\Delta}{4a} \rightarrow \text{عرض سینی} \quad -\frac{b}{2a} \rightarrow \text{طول سینی}$$

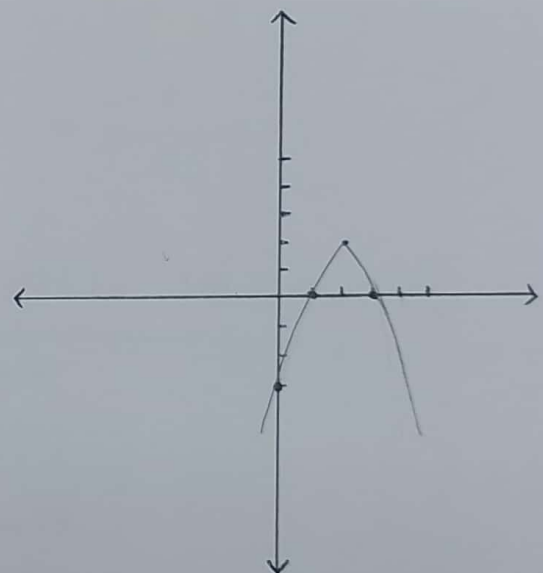
$$\Delta = b^2 - 4ac \quad (4)^2 - 4(-1)(-3) = 4 = \Delta$$

$$-\frac{4}{4(-1)} = 1 \quad -\frac{4}{2(-1)} = 2$$

عرض سینی طول سینی

$$y = -x^2 + 4x - 3 \xrightarrow{x=0} x \begin{cases} 1 \\ 3 \end{cases} \quad x=0 \rightarrow y = -3$$

عرض از مبدأ



۲ ②

$$2x^2 - 3x + a = 0 \quad \Delta > 0 \rightarrow \text{۲ جواب حقیقی}$$

$$\Delta > 0 \rightarrow b^2 - 4ac > 0 \rightarrow 9 - 4(2)(a) > 0 \Rightarrow 1 - 8a > 0$$

$$\Delta = 0 \rightarrow \text{ریشه مضاعف}$$

$$\Delta = 0 \rightarrow b^2 - 4ac = 0 \rightarrow 9 - 4(2)(a) = 0 \Rightarrow a = \frac{9}{8}$$

الف) ۵، ۴، ۵

ب) ۵، ۵، ۵

①

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

$$9 - 18a < 0 \rightarrow \frac{9}{18} < a$$

$$\Delta < 0 \rightarrow b^2 - 4ac < 0 \rightarrow 9 - 4(2)(a) < 0 \Rightarrow a > 1$$

جواب ندارد

(3)

(4)

$$\text{الف) } x^2 - 2x - 1 = 0 \quad x^2 - 2x + 1 = 2 \rightarrow (x-1)^2 = 2 \rightarrow x-1 = \pm\sqrt{2}$$

$$\Rightarrow x \rightarrow 1 + \sqrt{2}$$

$$\rightarrow 1 - \sqrt{2}$$

بازرسی

(5)

$$\text{ب) } x^2 - x - 1 = 0$$

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

$$\rightarrow x - \frac{1}{2} = \pm\sqrt{\frac{5}{4}} \rightarrow x = \frac{1}{2} \pm \frac{\sqrt{5}}{2} \Rightarrow x \rightarrow \frac{1 + \sqrt{5}}{2}$$

$$\rightarrow \frac{1 - \sqrt{5}}{2}$$

$$\text{الف) } x^2 - 2x + 1 = 0$$

$$\Delta = b^2 - 4ac \rightarrow (-2)^2 - 4(1)(1) = 0$$

$$\frac{-b \pm \sqrt{\Delta}}{2a} \rightarrow \frac{-(-2) \pm \sqrt{0}}{2(1)} = \frac{2}{2} = 1$$

بازرسی

(6)

$$\text{ب) } x^2 + x + 2 = 0$$

$$\Delta = b^2 - 4ac \rightarrow (1)^2 - 4(1)(2) = -7$$

جواب حقیقی ندارد

$$\text{الف) } x^2 - 11x + 28 = 0$$

$$(x-4)(x-7) \Rightarrow x \rightarrow 7$$

$$\rightarrow 4$$

بازرسی

(7)

$$\text{ب) } x^2 + 3x - 28 = 0$$

$$(x-4)(x+7) \Rightarrow x \rightarrow -7$$

$$\rightarrow 4$$

$$\text{الف) } 5x^2 - 12x + 7 = 0 \rightarrow x^2 - 12x + 35 = 0 \rightarrow (x-7)(x-5) \Rightarrow x \rightarrow \frac{5}{5} = 1$$

$$\rightarrow \frac{7}{5}$$

(8)

$$\text{ب) } 3x^2 - 10x + 7 = 0 \rightarrow x^2 - 10x + 21 = 0 \rightarrow (x-3)(x-7) \Rightarrow x \rightarrow \frac{7}{3}$$

$$\rightarrow \frac{3}{3} = 1$$

بازرسی

الف) $2x^2 - 5x + 3 = 0 \rightarrow x^2 - 5x + 4 = 0 \rightarrow (x-3)(x-2) = 0 \Rightarrow x \rightarrow \frac{2}{1} = 2$ ✓

ب) $2x^2 + 5x + 3 = 0 \rightarrow x^2 + 5x + 4 = 0 \rightarrow (x+3)(x+2) = 0 \Rightarrow x \rightarrow -\frac{2}{1} = -2$ ✓

ج) $2x^2 - 5x + 1 = 0$ $\Delta = b^2 - 4ac$ $\Delta = 25 - 4(2)(1) = 17$

$\frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-(-5) \pm \sqrt{17}}{2} \Rightarrow x \rightarrow \frac{5 + \sqrt{17}}{2}$ ✓
 $\frac{5 - \sqrt{17}}{2}$ ✓

د) $4x^2 + 7x + 9 = 0$ $49 - 4 \times (4) \times (9) = -95$ ✓

ریشه حقیقی ندارد.

الف) $s^2 - 2p \left(\frac{-3}{1} \right)^2 - 2 \left(\frac{-2}{1} \right) = 13$ ✓
 $s = \frac{-b}{a} = -\frac{-3}{1} = +3$ ④
 $p = \frac{c}{a} = -2$

ب) $s^3 - 3sp \left(\frac{-3}{1} \right)^2 - 3 \left(\frac{-2}{1} \right) \left(\frac{-2}{1} \right) = 27$ ✓
 $(3)^3 - 3(3)(-2)(-2) = 27 + 18 = 45$

الف) $\binom{7}{5} + \binom{9}{2} = \frac{7!}{5! \times 2!} + \frac{9!}{2! \times 7!} = \frac{7 \times 6}{2} + \frac{9 \times 8}{2} = 21 + 36 = 57$ ①

ب) $\binom{9}{3} - \binom{1}{2} = \frac{9!}{3! \times 6!} + \frac{1!}{2! \times 0!} = \frac{9 \times 8 \times 7}{6} + \frac{1 \times 1}{2} = 126 + 0.5 = 126.5$ ②