

الف) $x^2 - 4x + 1 = 0 \xrightarrow{+1} x^2 - 4x + 4 = (x-2)^2 - 1 \Rightarrow (x-2)^2 = 1 \Rightarrow x-2 = \pm 1$
 $\begin{cases} x = 3 \\ x = 1 \end{cases}$

ب) $x^2 + 14x + 49 = 0 \xrightarrow{+9} x^2 + 14x + 49 = (x+7)^2 - 9 = (x+7)^2 = 9 \Rightarrow$
 $= x+7 = \pm 3 \Rightarrow \begin{cases} x = -4 \\ x = -10 \end{cases}$

الف) $x^2 - 2x + 4 = 0 \Rightarrow (x-1)(x-3) \Rightarrow \begin{cases} x = +3 \\ x = +1 \end{cases}$

ب) $x^2 - 2x - 11 = 0 \Rightarrow (x-7)(x+5) \Rightarrow \begin{cases} x = -5 \\ x = +7 \end{cases}$

الف) $x^2 - 3x - 2 = 0$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Rightarrow \frac{3 \pm \sqrt{9 + 16}}{2} = \frac{3 \pm \sqrt{25}}{2}$

ب) $2x^2 - 5x + \frac{1}{2} = 0$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Rightarrow \frac{5 \pm \sqrt{25 - 2}}{4} = \frac{5 \pm \sqrt{23}}{4}$

الف) $x^2 - 3x + 2 = 0 \Rightarrow (x-1)(x-2) \Rightarrow \begin{cases} x = 2 \\ x = 1 \end{cases}$ $\checkmark$ صحیح است.

ب) $4x^2 + x - 3 = 0$

$x^2 + x - 12 = 0 \Rightarrow (x+4)(x-3) \Rightarrow \begin{cases} x = -\frac{4}{1} = -4 \\ x = \frac{3}{1} = 3 \end{cases}$ $\hookrightarrow$

الف) $4x^2 - 12x + 9 = 0$

$x^2 - 3x + \frac{9}{4} = 0 \Rightarrow (x-\frac{3}{2})(x-\frac{3}{2}) \Rightarrow \begin{cases} x = \frac{3}{2} = 1.5 \\ x = \frac{3}{2} = 1.5 \end{cases}$

ب) $3x^2 - 10x + 7 = 0$

$x^2 - 10x + 21 = 0 \Rightarrow (x-3)(x-7) \Rightarrow \begin{cases} x = \frac{7}{1} = 7 \\ x = \frac{3}{1} = 3 \end{cases}$

$$\text{الف) } -3x^2 + 2x - 1 = 0$$

$$\Delta = b^2 - 4ac = 2^2 - 12 = -10$$

$$\Delta < 0 \Rightarrow \text{لا يوجد حقيقي}$$

$$\text{ب) } 2x^2 - x + 1 = 0$$

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

$$\Delta < 0 \Rightarrow \text{لا يوجد حقيقي}$$

$$\text{ب) } 2x^2 - x + 2 = 0$$

$$\Delta = b^2 - 4ac = 1 - 16 = -15$$

$$\Delta < 0 \Rightarrow \text{لا يوجد حقيقي}$$

$$\text{ب) } 2x^2 - 4x + 2 = 0$$

$$\Delta = b^2 - 4ac = 16 - 16 = 0$$

$$\Delta = 0 \Rightarrow \text{مضاعف}$$

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

$$\text{الف) } \Delta = b^2 - 4ac = 9 - 4a$$

$$9 - 4a > 0 \Rightarrow 4a < 9 \Rightarrow a < \frac{9}{4}$$

$$\text{ب) } 9 - 4a = 0$$

$$4a = 9 \Rightarrow a = \frac{9}{4}$$

$$2) 9 - 4a < 0$$

$$4a > 9 \Rightarrow a > \frac{9}{4}$$

$$3) 9 - 4a \geq 0$$

$$4a \leq 9 \Rightarrow a \leq \frac{9}{4}$$

$$x^2 + 4x + a$$

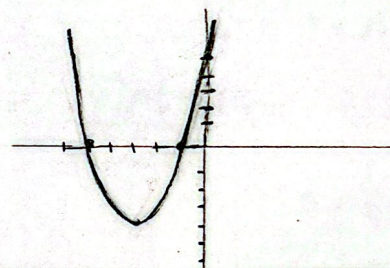
$$\text{الف) } x = \frac{-b}{2a} = \frac{-4}{2} = -2 / y = \frac{-\Delta}{4a} = \frac{16 - 40}{4} = -3$$

$$\text{ب) } x^2 + 4x + a = (x+1)(x+a) \begin{cases} x = -1 \\ x = -a \end{cases}$$

$$y = 0 \Rightarrow (-1, 0), (-a, 0)$$

$$x = 0 \Rightarrow (0)^2 + 4(0) + a = a \Rightarrow (0, a)$$

صينية / حتميات $(-3, -4)$



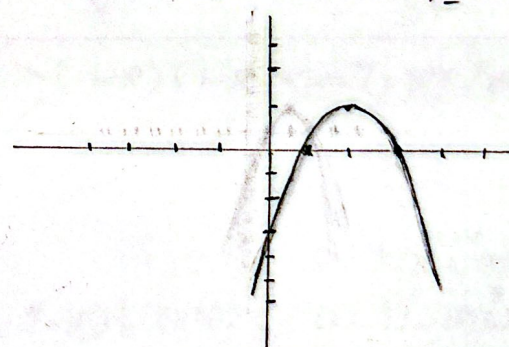
$$-x^2 + 4x - 3$$

$$\text{الف) } x = \frac{-b}{2a} = \frac{-4}{-2} = 2 / y = \frac{-\Delta}{4a} = \frac{16 - 12}{-4} = -1$$

$$\text{ب) } y = 0 \Rightarrow -x^2 + 4x - 3 = (x+1)(x+3) \begin{cases} x = -3 \\ x = -1 \end{cases}$$

نقطه $(3, 0)$ و $(1, 0)$ و $(0, 3)$ قطع می کند.

صالحه / حتميات $(2, 1)$



$$x^2 - 3x - 2 = 0 \Rightarrow S = \frac{-b}{a} = \frac{3}{1} = 3 / P = \frac{c}{a} = \frac{-2}{1} = -2$$

$$\text{الف) } S^2 - 3P = (3)^2 - 3(-2) = 9 + 6 = 15$$

$$\text{ب) } S^3 - 3SP = (3)^3 - 3(3)(-2) = 27 + 18 = 45$$