

الف) $x^2 - 6x + 8 = 0 \xrightarrow{(+1) (+1)} x^2 - 6x + 9 = 1 \rightarrow (x-3)^2 = 1 \rightarrow x-3 = \pm 1 \Rightarrow \begin{cases} x=4 \\ x=2 \end{cases}$

ب) $x^2 + 8x + 7 = 0 \xrightarrow{(+9) (+9)} x^2 + 8x + 16 = 9 \rightarrow (x+4)^2 = 9 \rightarrow x+4 = \pm 3 \Rightarrow \begin{cases} x=-1 \\ x=-7 \end{cases}$

الف) $x^2 - 5x + 6 = 0 \rightarrow (x-2)(x-3) = 0 \Rightarrow \begin{cases} x=2 \\ x=3 \end{cases}$

ب) $x^2 - 5x - 14 = 0 \rightarrow (x-7)(x+2) = 0 \Rightarrow \begin{cases} x=7 \\ x=-2 \end{cases}$

الف) $x^2 - 3x - 5 = 0 \Rightarrow x = \frac{-(-3) \pm \sqrt{9+20}}{2(1)} \Rightarrow x = \frac{3 \pm \sqrt{29}}{2} \Rightarrow \begin{cases} x = \frac{3 + \sqrt{29}}{2} \\ x = \frac{3 - \sqrt{29}}{2} \end{cases}$

ب) $2x^2 - 4x + \frac{1}{2} = 0 \Rightarrow x = \frac{-(-4) \pm \sqrt{16-4}}{2(2)} \Rightarrow x = \frac{4 \pm \sqrt{12}}{4} = \frac{4 \pm 2\sqrt{3}}{4} \Rightarrow x = \frac{2 \pm \sqrt{3}}{2} \Rightarrow \begin{cases} x = \frac{2 + \sqrt{3}}{2} \\ x = \frac{2 - \sqrt{3}}{2} \end{cases}$

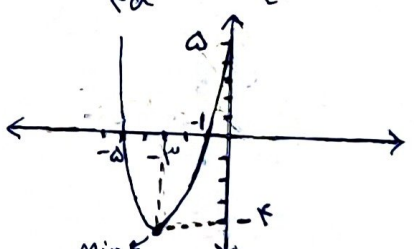
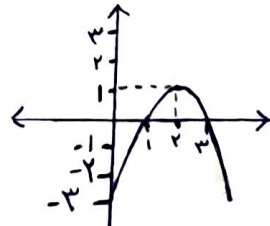
الف) $x^2 - 3x + 2 = 0 \rightarrow (x-1)(x-2) = 0 \Rightarrow \begin{cases} x=1 \\ x=2 \end{cases}$

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

(راه دیگر: $1 + (-3) + 2 = 0 \rightarrow x=1$
 $4 + (-3) = 1 \rightarrow x = -1$
 $x = -\frac{c}{a} = \frac{3}{4}$)

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

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

الف) $-3x^2 + 5x - 1 = 0 \quad \Delta = b^2 - 4ac = 25 - 4(-3 \times (-1)) = 13 \rightarrow \Delta > 0 \Rightarrow$ دو ریشه حقیقی متمایز دارد. ب) $2x^2 - x + 2 = 0 \quad \Delta = b^2 - 4ac = 1 - 16 = -15 \rightarrow \Delta < 0 \Rightarrow$ بدون ریشه حقیقی پ) $2x^2 - 4x + 2 = 0 \quad \Delta = b^2 - 4ac = 16 - 16 = 0 \rightarrow \Delta = 0 \Rightarrow$ یک ریشه مضاعف ت) $2x^2 - x + 1 = 0 \quad \Delta = b^2 - 4ac = 1 - 4(2) = -7 \rightarrow \Delta < 0 \Rightarrow$ بدون ریشه حقیقی	۶
الف) $\Delta > 0 \Rightarrow b^2 - 4ac > 0 \Rightarrow 9 - 4a > 0 \Rightarrow 9 > 4a \Rightarrow \boxed{\frac{9}{4} > a} \subseteq (-\infty, \frac{9}{4})$ ب) $\Delta = 0 \Rightarrow b^2 - 4ac = 0 \Rightarrow 9 - 4a = 0 \Rightarrow 9 = 4a \Rightarrow \boxed{\frac{9}{4} = a}$ ج) $\Delta < 0 \Rightarrow b^2 - 4ac < 0 \Rightarrow 9 - 4a < 0 \Rightarrow 9 < 4a \Rightarrow \boxed{\frac{9}{4} < a} \subseteq (\frac{9}{4}, +\infty)$ د) $\Delta \geq 0 \Rightarrow b^2 - 4ac \geq 0 \Rightarrow 9 - 4a \geq 0 \Rightarrow 9 \geq 4a \Rightarrow \boxed{\frac{9}{4} \geq a} \subseteq (-\infty, \frac{9}{4}]$	۷
$y = x^2 + 4x + 5 \quad a > 0 \Rightarrow \text{Min}$ $\left \begin{array}{l} -3 \leftarrow -\frac{b}{2a} = -\frac{4}{2} = -2 \\ -4 \leftarrow -\frac{\Delta}{4a} = -\frac{(16-20)}{4} = 1 \end{array} \right.$ (الف) $\hookrightarrow 0 = x^2 + 4x + 5$ $0 = (x+1)(x+5) \Rightarrow \begin{cases} x = -1 \\ x = -5 \end{cases}$ $\Rightarrow$ تقاطعی که معنی محور ها را قطع می کند: $\begin{bmatrix} -1 \\ 0 \end{bmatrix}, \begin{bmatrix} -5 \\ 0 \end{bmatrix}$  (ب)	۸
$y = -x^2 + 4x - 3 \quad a < 0 \Rightarrow \text{Max}$ $\left \begin{array}{l} 2 \leftarrow -\frac{b}{2a} = -\frac{4}{-2} = 2 \\ 1 \leftarrow -\frac{\Delta}{4a} = -\frac{(16-12)}{-4} = 1 \end{array} \right.$ (الف) $-x^2 + 4x - 3 = 0$ (ب) $a+b+c=0 \rightarrow \begin{cases} x=1 \\ x=\frac{c}{a} \end{cases} \Rightarrow (-1)+4+(-3)=0$ $\Rightarrow \begin{cases} x=1 \\ x=3 \end{cases} \Rightarrow$ تقاطعی که معنی محور ها را قطع می کند: $\begin{bmatrix} 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 3 \\ 0 \end{bmatrix}$ 	۹
$x^2 - 3x - 2 = 0 \rightarrow \begin{cases} S = -\frac{b}{a} = -\frac{(-3)}{1} = 3 \\ P = \frac{c}{a} = \frac{-2}{1} = -2 \end{cases}$ الف) $S^2 - 2P = (3)^2 - 2(-2) = 13$ ب) $S^3 - 3SP = (3)^3 - 3(3)(-2) = 27$	۱۰