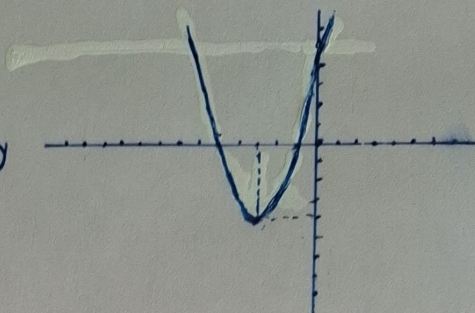


$$y = x^2 + 4x + 5$$

$$\text{الف) } \min \left| \begin{array}{l} -\frac{b}{2a} \Rightarrow \frac{-4}{2} = -2 \\ ? \Rightarrow 4 - 16 + 5 = -7 \end{array} \right\} \Rightarrow \min \left| \begin{array}{l} -2 \\ -7 \end{array} \right|$$

ب)

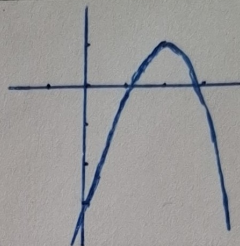


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$$y = -x^2 + 4x - 3$$

$$\text{الف) } \max \left| \begin{array}{l} -\frac{b}{2a} \Rightarrow \frac{-4}{-2} = 2 \\ ? \Rightarrow -4 + 16 - 3 = 9 \end{array} \right\} \Rightarrow \max \left| \begin{array}{l} 2 \\ 9 \end{array} \right|$$

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



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

$$\text{الف) } \Delta > 0 \Rightarrow \Delta = b^2 - 4ac \Rightarrow 9 - 12a > 0 \Rightarrow 9 > 12a \Rightarrow \frac{3}{4} > a$$

$$\text{ب) } \Delta = 0 \Rightarrow \Delta = b^2 - 4ac \Rightarrow 9 - 12a = 0 \Rightarrow 9 = 12a \Rightarrow \frac{3}{4} = a$$

$$\text{ج) } \Delta < 0 \Rightarrow \Delta = b^2 - 4ac \Rightarrow 9 - 12a < 0 \Rightarrow 9 < 12a \Rightarrow \frac{3}{4} < a$$

$$\text{د) } \Delta \geq 0 \Rightarrow \Delta = b^2 - 4ac \Rightarrow 9 - 12a \geq 0 \Rightarrow 9 \geq 12a \Rightarrow \frac{3}{4} \geq a$$

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

$$\text{ب) } x^2 - x - 1 = 0 \Rightarrow x^2 - x + \frac{1}{4} = \frac{5}{4} \Rightarrow (x - \frac{1}{2})^2 = \frac{5}{4} \Rightarrow x - \frac{1}{2} = \pm \frac{\sqrt{5}}{2} \Rightarrow x = \frac{1 \pm \sqrt{5}}{2}$$

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$$\text{الف) } x^2 - 2x - 1 = 0 \Rightarrow \Delta = b^2 - 4ac = 4 + 4 = 8 \Rightarrow x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{2 \pm 2\sqrt{2}}{2} = 1 \pm \sqrt{2} \Rightarrow x = 1 - \sqrt{2} \text{ و } x = 1 + \sqrt{2}$$

$$\text{ب) } x^2 + x - 4 = 0 \Rightarrow \Delta = 1 + 16 = 17 \Rightarrow x = \frac{-1 \pm \sqrt{17}}{2} \Rightarrow x = \frac{-1 + \sqrt{17}}{2} \text{ و } x = \frac{-1 - \sqrt{17}}{2}$$

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الف) $x^2 - 11x + 18 = 0 \Rightarrow (x-2)(x-9) = 0 \rightarrow \begin{cases} x=2 \\ x=9 \end{cases}$

6

ب) $x^2 + 3x - 28 = 0 \Rightarrow (x+7)(x-4) = 0 \rightarrow \begin{cases} x=-7 \\ x=4 \end{cases}$

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

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

الف) $2x^2 - 5x + 3 = 0 \rightarrow a+b+c = 0 \rightarrow 2+3-5 = 0 \rightarrow x=1 \vee x = \frac{3}{2}$

8

ب) $2x^2 + 4x + 3 = 0 \rightarrow a+b+c = 0 \rightarrow 2+3+4 = 9 \neq 0 \rightarrow x=1 \vee x = -\frac{3}{2}$

ج) $2x^2 - 5x + 1 = 0 \rightarrow \Delta = b^2 - 4ac = 25 - 4 = 21 \Rightarrow \begin{cases} x = \frac{5 \pm \sqrt{21}}{4} \end{cases}$

د) $4x^2 + 7x + 9 = 0 \rightarrow \Delta = b^2 - 4ac = 49 - 36 = 13 \Rightarrow \Delta < 0 \rightarrow \text{معادلات حقیقی ندارد} \times$

$x^2 - 3x - 2 = 0$ جمع ریشه = $S = -\frac{b}{a}$ ضرب ریشه = $P = \frac{c}{a}$

الف) $S^2 - 3P = \left(-\frac{b}{a}\right)^2 - 3 \cdot \frac{c}{a} = \frac{b^2}{a^2} - \frac{3c}{a} = \frac{b^2 - 3ca}{a^2} = \frac{9 - 3(-2)}{1} = 15$

9

ب) $S^2 - 3SP = \frac{b^2}{a^2} - 3 \left(\frac{-b}{a}\right) \left(\frac{c}{a}\right) = \frac{b^2 + 3abc}{a^2} = \frac{9 + 12}{1} = 21$

الف) $\begin{pmatrix} 1 \\ 2 \end{pmatrix} + \begin{pmatrix} 9 \\ 4 \end{pmatrix} = \begin{pmatrix} 1+9 \\ 2+4 \end{pmatrix} = \begin{pmatrix} 10 \\ 6 \end{pmatrix}$

10

ب) $\begin{pmatrix} 9 \\ 4 \end{pmatrix} - \begin{pmatrix} 1 \\ 2 \end{pmatrix} = \begin{pmatrix} 9-1 \\ 4-2 \end{pmatrix} = \begin{pmatrix} 8 \\ 2 \end{pmatrix}$

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