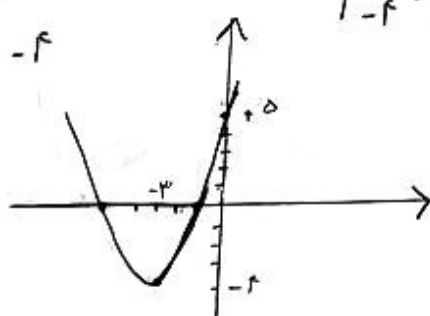


الف) $y = x^2 + 7x + 5$ $\min$ $\left| \begin{array}{l} \frac{-b}{2a} = \frac{-7}{2} = -3.5 \\ \frac{-\Delta}{4a} = \frac{-14}{4} = -3.5 \end{array} \right.$ $\left| \begin{array}{l} -3.5 \\ -4 \end{array} \right.$ $\left| \begin{array}{l} -3.5 \\ -4 \end{array} \right.$ $\left| \begin{array}{l} -3.5 \\ -4 \end{array} \right.$

ب) $\Delta = b^2 - 4ac = 49 - (4 \times 1 \times 5) = 14$

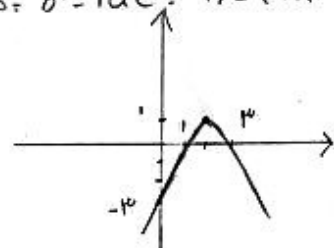
$y=0 \rightarrow x^2 + 7x + 5 = 0$
 $(x+1)(x+5) = 0$
 $x = -1, x = -5$



الف) $y = -x^2 + 4x - 3$ $\Delta = b^2 - 4ac = 16 - (4 \times 1 \times -3) = 16 + 12 = 28$ $\left| \begin{array}{l} 2 \\ 1 \end{array} \right.$ $\left| \begin{array}{l} 2 \\ 1 \end{array} \right.$ $\left| \begin{array}{l} 2 \\ 1 \end{array} \right.$

ب) $\max$ $\left| \begin{array}{l} \frac{-b}{2a} = \frac{-4}{-2} = 2 \\ \frac{-\Delta}{4a} = \frac{-28}{-4} = 7 \end{array} \right.$

$y=0 \rightarrow 0 = -x^2 + 4x - 3 \rightarrow 0 = -(x-1)(x-3) \rightarrow x=1, x=3$



الف) $2x^2 - 3x + a = 0$ $\Delta = b^2 - 4ac = 9 - (4 \times 2 \times a) = 9 - 8a$

ب) $a = \frac{9}{8}$

ج) $a > \frac{9}{8}$

د) $a < \frac{9}{8}$

$\Delta = 0 \Rightarrow 9 - 8a = 0 \Rightarrow a = \frac{9}{8}$

$\Delta < 0 \Rightarrow 9 - 8a < 0 \Rightarrow a > \frac{9}{8}$

$\Delta > 0 \Rightarrow 9 - 8a > 0 \Rightarrow a < \frac{9}{8}$

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

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

الف) $x^2 - 2x - 1 = 0$ $\Delta = b^2 - 4ac = 4 - (4 \times 1 \times -1) = 8$

ب) $x^2 + x - 4 = 0$ $\Delta = b^2 - 4ac = 1 - (4 \times 1 \times -4) = 17$

$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-2 \pm \sqrt{8}}{2} = 1 \pm \sqrt{2}$

$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-1 \pm \sqrt{17}}{2}$

$$\text{الف) } x^2 - 11x + 21 = 0 \rightarrow (x-4)(x-7) = 0 \Rightarrow x=4, x=7$$

$$\text{ب) } x^2 + 3x - 21 = 0 \rightarrow (x-4)(x+7) = 0 \Rightarrow x=4, x=-7$$

$$\text{الف) } 5x^2 - 12x + 7 = 0$$

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

$$\text{ب) } 3x^2 - 10x + 7 = 0$$

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

$$\text{الف) } 2x^2 - 5x + 3 = 0$$

$$\begin{cases} x = +1 \\ x = \frac{+3}{2} = \frac{3}{2} \end{cases} \quad \text{مجموع ضرب = صفر} \quad \begin{cases} x = -1 \\ x = \frac{3}{2} \end{cases}$$

$$\text{ب) } 2x^2 + 5x + 3 = 0$$

$$\begin{cases} x = -1 \\ x = \frac{3}{2} = \frac{3}{2} \end{cases} \quad \text{مجموع دو عدد مساوی ضرب در 2 = ضرب در 4} \quad \begin{cases} x = -1 \\ x = \frac{3}{2} \end{cases}$$

$$\text{ج) } 2x^2 - 5x + 1 = 0$$

$$\Delta = b^2 - 4ac = 25 - (4 \times 2 \times 1) = 17 \rightarrow x = \frac{b \pm \sqrt{\Delta}}{2a} = \frac{5 \pm \sqrt{17}}{4}$$

$$\text{د) } 4x^2 + 7x + 9 = 0$$

$$\Delta = b^2 - 4ac = 49 - (4 \times 4 \times 9) = -95 \quad \Delta < 0 \quad \text{ریشه حقیقی ندارد}$$

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

$$\begin{cases} \delta = \frac{-b}{a} = \frac{3}{1} = 3 \\ \rho = \frac{c}{a} = \frac{-2}{1} = -2 \end{cases}$$

$$\text{الف) } S^2 - 2p =$$

$$3^2 - (2 \times -2) = 9 + 4 = 13$$

$$\text{ب) } S^3 - 3Sp =$$

$$3^3 - (3 \times 3 \times -2) = 27 + 18 = 45$$

$$\text{الف) } \binom{8}{5} + \binom{9}{2}$$

$$\frac{3 \times 2 \times 1}{5! \times 3!} + \frac{9!}{2! \times 7!} = 21 \Rightarrow 3 \times 2 + 21 = \boxed{27}$$

$$\text{ب) } \frac{n!}{x!(n-x)!}$$

$$\frac{9!}{4! \times 5!} = 126$$

$$\text{ج) } \binom{9}{10} - \binom{8}{2}$$

$$= 11 - 28 = \boxed{-17}$$

$$\frac{3 \times 2 \times 1}{5! \times 3!}$$

$$\binom{8}{2} = \frac{8 \times 7}{2! \times 6!} = 28$$