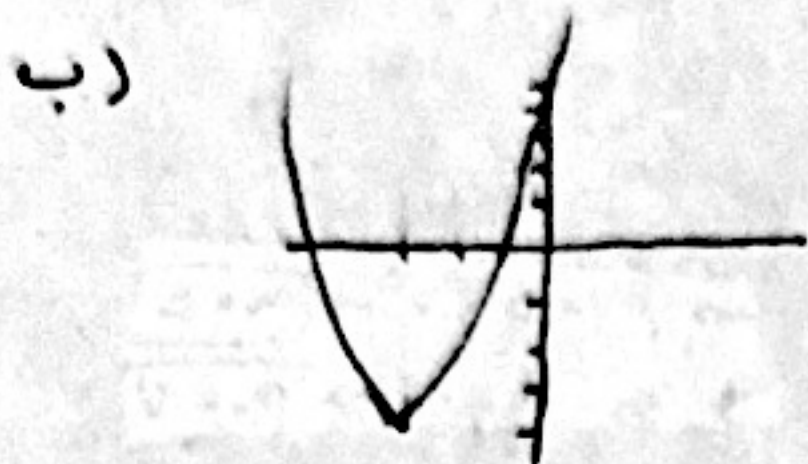
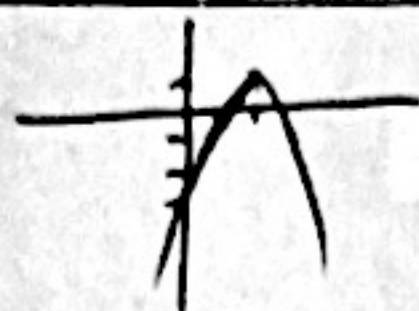


الف) $a > 0 \rightarrow \min \left| \begin{array}{l} \frac{-b}{2a} = \frac{-4}{2} = -2 \\ (-2)^2 + 4(-2) + 5 = -1 \end{array} \right.$



الف) $a < 0 \rightarrow \max \left| \begin{array}{l} \frac{-b}{2a} = \frac{-2}{-2} = 1 \\ -(1)^2 + 4(1) - 3 = 1 \end{array} \right.$



ب) $-x^2 + 2x - 2$ ^{بهشت آوردن} $\Delta = b^2 - 4ac = 14 - 12 = 2$
^{ریشه ها از طریق}
 $x = \frac{-b \pm \sqrt{\Delta}}{2a} \rightarrow \frac{-2 \pm \sqrt{2}}{-2} \rightarrow \begin{cases} \frac{-2 + \sqrt{2}}{-2} = 1 \\ \frac{-2 - \sqrt{2}}{-2} = 3 \end{cases}$

$y = 4x^2 - 4x + a = 0 \Rightarrow \Delta = b^2 - 4ac = 9 - 16a$

الف) $\Delta > 0 \rightarrow 9 - 16a > 0 \rightarrow a < \frac{9}{16}$

ب) $\Delta = 0 \rightarrow 9 - 16a = 0 \rightarrow a = \frac{9}{16}$

ج) $\Delta < 0 \rightarrow 9 - 16a < 0 \rightarrow a > \frac{9}{16}$

د) $\Delta \geq 0 \rightarrow 9 - 16a \geq 0 \rightarrow a \leq \frac{9}{16}$

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

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

الف) $x^2 - 2x - 1 = 0 \rightarrow \Delta = b^2 - 4ac = 2 + 4 = 6 \rightarrow x = \frac{-b \pm \sqrt{\Delta}}{2a} \rightarrow x = \frac{2 \pm \sqrt{6}}{2} = 1 \pm \sqrt{\frac{3}{2}}$
 $\rightarrow x = 1 \pm \sqrt{2}$

ب) $x^2 + x - 2 = 0 \rightarrow \Delta = b^2 - 4ac = 1 + 8 = 9 \rightarrow x = \frac{-b \pm \sqrt{\Delta}}{2a} \rightarrow x = \frac{-1 \pm \sqrt{9}}{2} = \frac{-1 \pm 3}{2}$

$$\text{الف) } x^2 - 11x + 28 = 0 \rightarrow (x-4)(x-7) = 0 \rightarrow x-4=0 \rightarrow \boxed{x=4} \\ \rightarrow x-7=0 \rightarrow \boxed{x=7}$$

$$\text{ب) } x^2 + 3x - 28 = 0 \rightarrow (x-4)(x+7) = 0 \rightarrow x-4=0 \rightarrow \boxed{x=4} \\ \rightarrow x+7=0 \rightarrow \boxed{x=-7}$$

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

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

$$\text{الف) } 2x^2 - 5x + 3 = 0 \xrightarrow{a+b+c} \begin{cases} x=1 \\ x=\frac{c}{a} = \frac{3}{2} \end{cases}$$

$$\text{ب) } 2x^2 + 5x + 3 = 0 \xrightarrow{a+c=b} \begin{cases} x=-1 \\ x=-\frac{c}{a} = -\frac{3}{2} \end{cases}$$

$$\text{ج) } 2x^2 - 5x + 1 = 0 \xrightarrow{\Delta} \Delta = b^2 - 4ac = 25 - 20 = 5 > 0 \rightarrow x = \frac{-b \pm \sqrt{\Delta}}{2a} \rightarrow x = \frac{5 \pm \sqrt{5}}{4}$$

$$\text{د) } 5x^2 + 7x + 9 = 0 \xrightarrow{\Delta} \Delta = b^2 - 4ac = 49 - 180 = -131 < 0 \rightarrow \Delta < 0 \\ \text{فاقد ریشه حقیقی}$$

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

$$\text{الف) } S^2 - 2P \rightarrow (3)^2 - 2(-2) = 9 + 4 = 13$$

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

$$\text{الف) } \binom{5}{2} + \binom{9}{1} = \frac{5!}{2!3!} + \frac{9!}{1!8!} = \frac{5 \times 4 \times 3}{2 \times 1} + \frac{9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1}{1 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1} = 10 + 9 = 19$$

$$\text{ب) } \binom{9}{3} - \binom{8}{2} = \frac{9!}{3!6!} - \frac{8!}{2!6!} = \frac{9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1}{3 \times 2 \times 1 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1} - \frac{8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1}{2 \times 1 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1} = 84 - 28 = 56$$