

الف) $\min \quad \max \left\{ \begin{array}{l} -\frac{b}{2a} \\ -\frac{\Delta}{4a} \end{array} \right\} = \left\{ \begin{array}{l} -\frac{4}{2} \\ -\frac{14}{4} \end{array} \right\} = \left\{ \begin{array}{l} -2 \\ -3.5 \end{array} \right\}$

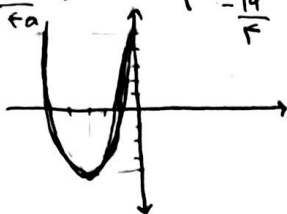
$\Delta = b^2 - 4ac = 14 - 20 = -6$

معمولاً از مبدأ: $0 + 0 + 5 = 5$

طول از مبدأ: $(2, 1) \rightarrow (2, 5) \rightarrow x = -1$
 $x = -5$

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ب)



الف) $\max \quad \min \left\{ \begin{array}{l} -\frac{b}{2a} \cdot -\frac{b}{2a} \rightarrow 2 \\ -\frac{\Delta}{4a} \cdot -\frac{\Delta}{4a} \rightarrow 1 \end{array} \right\}$

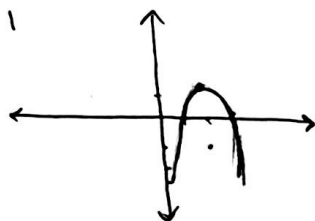
$\Delta = b^2 - 4ac = 14 - 4(-1)(-3) = 2$

معمولاً از مبدأ: -3

طول از مبدأ: $-(x^2 - 4x + 3) = -(x-1)(x-3)$
 $x = 1$ $x = 3$

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ب) ۱) $\frac{2}{-1} = -2$



$\Delta > 0 \rightarrow b^2 - 4ac \rightarrow 9 - 4(2)(a) \rightarrow 9 - 8a > 0 \rightarrow -8a > -9 \rightarrow a < \frac{9}{8} \rightarrow a < 1.125$ (الف)

$\Delta = 0 \rightarrow 9 - 8a = 0 \rightarrow 9 = 8a \rightarrow \frac{9}{8} = a \rightarrow a = 1.125$ (ب)

$\Delta < 0 \rightarrow 9 - 8a < 0 \rightarrow 9 < 8a \rightarrow \frac{9}{8} < a \rightarrow 1.125 < a$ (ج)

د) $a < \frac{9}{8} \cup a = \frac{9}{8} \rightarrow a \leq \frac{9}{8}$ (د)

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

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

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

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

د) $4 - 4(-1)(1) = 8$

$x = \frac{2 \pm \sqrt{8}}{2} = \frac{2 \pm 2\sqrt{2}}{2}$

$\frac{x(1+\sqrt{2})}{x} \quad \frac{x(1-\sqrt{2})}{x}$
 $x = \frac{1+\sqrt{2}}{1-\sqrt{2}} \rightarrow x = \frac{1-\sqrt{2}}{1+\sqrt{2}}$

ب) $x^2 + x - 4 = 0$

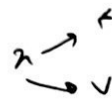
$\Delta = 1 - 4(1)(-4) = 1 + 16 = 17$

$x = \frac{-1 \pm \sqrt{17}}{2}$
 $x = \frac{-1 + \sqrt{17}}{2}$
 $x = \frac{-1 - \sqrt{17}}{2}$

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الف) $x^2 - 11x + 28$

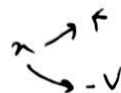
$(x-4)(x-7)$



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ب) $x^2 + 2x - 28$

$(x+7)(x-4)$



الف) $5x^2 - 12x + 7 = 0 \rightarrow x^2 - 12x + 35 = 0$
 $(x-5)(x-7)$

$x = \frac{V}{a} \quad x = \frac{D}{a} = 1$

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

$x = \frac{3}{3}$
 $x = \frac{-7}{1}$

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

ب) $2x^2 + 5x + 2 = 0 \quad a+c=b \quad x=-1 \quad x = -\frac{c}{a} = -\frac{2}{2}$

ج) $2x^2 - 5x + 1 = 0 \quad \Delta = b^2 - 4ac = 25 - 4(2)(1) = 9 \quad x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{5 \pm 3}{4}$

د) $4x^2 + 7x + 9 = 0 \quad \Delta = b^2 - 4ac = 49 - 4(4)(9) = -107$
 $x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-7 \pm \sqrt{-107}}{8}$

$s = -\frac{b}{a} \quad p = \frac{c}{a}$
 $-\frac{7}{-4} = 1.75 \quad p = \frac{9}{4} = 2.25$

الف) $s^2 - 2p \rightarrow 9 - 2(-2) = 13$

ب) $s^2 - 2ps \rightarrow 25 - 2(2)(-2) = 33$

الف) $\binom{5}{2} + \binom{9}{2} = \frac{5!}{2!(5-2)!} + \frac{9!}{2!(9-2)!} = 10 + 36 = 46$

$\binom{n}{k} = \frac{n!}{k!(n-k)!}$
 $\frac{9!}{2! \times 7!} = \frac{9 \times 8}{2} = 36$

ب) $\binom{9}{2} - \binom{1}{2} = \frac{9!}{2!(9-2)!} - \frac{1!}{2!(1-2)!} = 36 - 1 = 35$

$\frac{1!}{2! \times (-1)!} = \frac{1 \times 1}{2} = 0.5$