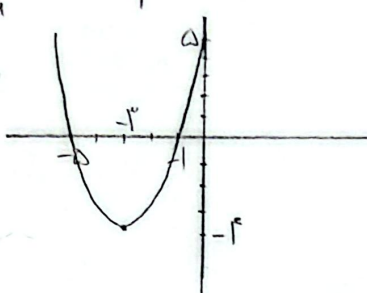
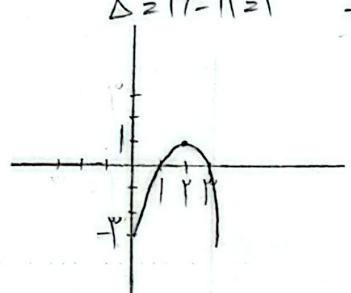


$\frac{-b}{2a}, \frac{-\Delta}{4a} \rightarrow \frac{-4}{2} = -2, \Delta = 4 - 20 = -16, \frac{-16}{4} = -4$
 $ext \left| \begin{matrix} -2 \\ -4 \end{matrix} \right. \xrightarrow{a > 0} \min$

 $x^2 + 4x + 5 = 0$
 $(x+1)(x+5) \Rightarrow x = -1, -5$
 ✓ محور را در -1 و -5 قطع می کند.

$\frac{-b}{2a}, \frac{-\Delta}{4a} \rightarrow \frac{-4}{2} = -2, \Delta = 4 - 12 = -8, \frac{-8}{4} = -2$
 $ext \left| \begin{matrix} -2 \\ -2 \end{matrix} \right. \xrightarrow{a < 0} \max$

 $-x^2 + 4x - 3 = 0 \rightarrow x^2 - 4x + 3 = 0$
 $(x-1)(x-3) \Rightarrow x = 1, 3$
 ✓ محور را در 1 و 3 قطع می کند.

$2x^2 - 3x + a = 0 \rightarrow \Delta = (-3)^2 - 4(2a) = 9 - 8a$
 $9 - 8a > 0 \Rightarrow 9 > 8a \Rightarrow \frac{9}{8} > a$
 $9 - 8a = 0 \Rightarrow 8a = 9 \Rightarrow a = \frac{9}{8}$
 $9 - 8a < 0 \Rightarrow 9 < 8a \Rightarrow a > \frac{9}{8}$
 $9 - 8a \geq 0 \Rightarrow 9 \geq 8a \Rightarrow a \leq \frac{9}{8}$
 $a < \frac{9}{8} : \Delta > 0$ (الف) دو جواب متمایز حقیقی
 $a = \frac{9}{8} : \Delta = 0$ (ب) یک ریشه مضاعف
 $a > \frac{9}{8} : \Delta < 0$ (ج) فاقد ریشه حقیقی
 $a \leq \frac{9}{8} : \Delta \geq 0$ (د) دارای ریشه (حداقل) اریبی حقیقی

$x^2 - 2x - 1 = 0 \Rightarrow x^2 - 2x = 1 \Rightarrow \left(\frac{-x}{x}\right)^2 = 1 \Rightarrow x^2 - x + 1 = 1 + 1 \Rightarrow (x-1)^2 = 2$
 $x-1 = \pm \sqrt{2} \Rightarrow$ ریشه ها: $x = 1 \pm \sqrt{2} \rightarrow x = 1 + \sqrt{2}, x = 1 - \sqrt{2}$
 $x^2 - x - 1 = 0 \Rightarrow x^2 - x = 1 \Rightarrow \left(\frac{-1}{x}\right)^2 = \frac{1}{x} \Rightarrow x^2 - x + \frac{1}{x} = 1 + \frac{1}{x} \Rightarrow \left(x - \frac{1}{x}\right)^2 = \frac{\Delta}{x^2}$
 $x - \frac{1}{x} = \pm \sqrt{\frac{\Delta}{x^2}} \Rightarrow$ ریشه ها: $x = \frac{1}{x} \pm \sqrt{\frac{\Delta}{x^2}} \Rightarrow x = \frac{1}{x} + \sqrt{\frac{\Delta}{x^2}}, x = \frac{1}{x} - \sqrt{\frac{\Delta}{x^2}}$

$x^2 - 2x - 1 = 0 \Rightarrow \Delta = (-2)^2 - 4(-1) = 8$ ریشه ها: $-\frac{b \pm \sqrt{\Delta}}{2a} \Rightarrow \frac{2 \pm \sqrt{8}}{2} \Rightarrow \frac{2 \pm 2\sqrt{2}}{2} \Rightarrow 1 \pm \sqrt{2}$
 $1 \pm \sqrt{2} \Rightarrow x = 1 + \sqrt{2}, 1 - \sqrt{2}$
 $x^2 + x - 4 = 0 \Rightarrow \Delta = (1)^2 - 4(-4) = 17$ ریشه ها: $-\frac{b \pm \sqrt{\Delta}}{2a} \Rightarrow \frac{-1 \pm \sqrt{17}}{2} \Rightarrow x = \frac{-1 + \sqrt{17}}{2}, x = \frac{-1 - \sqrt{17}}{2}$

$x^2 - 11x + 28 = 0$ $(x-7)(x-4) \Rightarrow x = 4, 7$	(الف)	٤
$x^2 + 3x - 28 = 0$ $(x+7)(x-4) \Rightarrow x = -7, 4$	(ب)	٤
$\Delta x^2 - 11x + 28 = 0 \Rightarrow x^2 - 11x + 28 \Rightarrow (x-7)(x-4) \Rightarrow x = \frac{7}{\Delta}, \frac{4}{\Delta} = 1$ $3x^2 - 10x + 7 = 0 \Rightarrow x^2 - 10x + 21 \Rightarrow (x-3)(x-7) \Rightarrow x = \frac{7}{3}, \frac{3}{7} = 1$	(الف) (ب)	٧
$2x^2 + \Delta x + 3 = 0 \rightarrow$ روش دلتا (ب) $\Delta = 2\Delta - 4(3 \times 2) = 1$ $x = \frac{-\Delta \pm \sqrt{1}}{4}$ $x = -\frac{3}{2}, -1$	$2x^2 - \Delta x + 3 = 0 \rightarrow$ روش روتی (الف) $x^2 - \Delta x + 3 = 0 \Rightarrow (x-2)(x-3) \Rightarrow x = \frac{3}{2}, \frac{2}{3} = 1$	١
$4x^2 + 7x + 9 = 0 \rightarrow$ روش دلتا (د) $49 - 4(9 \times 4) = -9\Delta \rightarrow$ دلتا منفی = معادله جواب ندارد	$2x^2 - \Delta x + 1 = 0 \rightarrow$ روش دلتا (ج) $2\Delta - 4(1 \times 1) = 17$ $x = \frac{\Delta + \sqrt{17}}{2}, \frac{\Delta - \sqrt{17}}{2}$	١
$S^2 - 2P$ $x^2 - 2x - 2 = 0 \Rightarrow P = \frac{c}{a} = -2 \quad S = \frac{-b}{a} = 2$ $(2)^2 - 2(-2) = 12$	(الف) (ب)	٩
$S^2 - 2SP$ $(2)^2 - 2(3 \times 2) = 4\Delta$		
$\binom{7}{\Delta} + \binom{9}{2} = \frac{7!}{\Delta! \times 6!} + \frac{9!}{2! \times 7!} = \frac{7 \times 6!}{\Delta \times 6!} + \frac{9 \times 8!}{2 \times 7!} = \frac{7}{\Delta} + \frac{36}{2} = 57$ $\binom{9}{3} - \binom{1}{2} = \frac{9!}{3! \times 6!} - \frac{1!}{2! \times 0!} = \frac{9 \times 8 \times 7}{6} + \frac{1 \times 1}{1} = 14 - 28 = 56$	(الف) (ب)	١٠