

الف) $x^2 - 6x + 8 = 0 \xrightarrow{+1} x^2 - 6x + 9 = 1 \rightarrow (x-3)^2 = 1$
 $\rightarrow x-3 = 1 \rightarrow x = 4$
 $\rightarrow x-3 = -1 \rightarrow x = 2$

ب) $x^2 + 8x + 7 = 0 \xrightarrow{+9} x^2 + 8x + 16 = 9 \rightarrow (x+4)^2 = 9$
 $\rightarrow x+4 = 3 \rightarrow x = -1$
 $\rightarrow x+4 = -3 \rightarrow x = -7$

الف) $x^2 - 5x + 6 = 0 \rightarrow (x-2)(x-3) = 0$
 $\rightarrow x = 2$
 $\rightarrow x = 3$

ب) $x^2 - 5x - 14 = 0 \rightarrow (x-7)(x+2) = 0$
 $\rightarrow x = 7$
 $\rightarrow x = -2$

الف) $x^2 - 3x - 5 = 0$

$x = \frac{-b \pm \sqrt{\Delta}}{2a} \Rightarrow x = \frac{3 \pm \sqrt{9 + 20}}{2} = \frac{3 \pm \sqrt{29}}{2}$
 $\rightarrow x = \frac{3 - \sqrt{29}}{2}$
 $\rightarrow x = \frac{3 + \sqrt{29}}{2}$

ب) $2x^2 - 4x + \frac{1}{2} = 0$

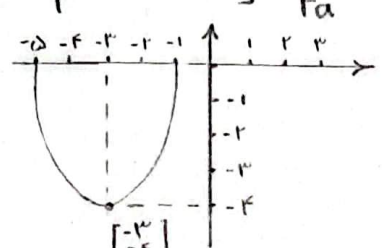
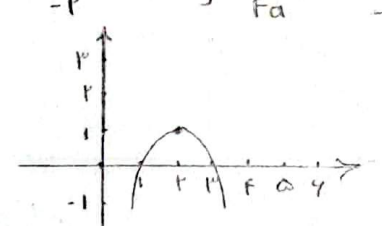
$x = \frac{-b \pm \sqrt{\Delta}}{2a} \Rightarrow x = \frac{4 \pm \sqrt{16 - 2}}{4} = 1 \pm \frac{\sqrt{14}}{2}$
 $\rightarrow x = 1 + \frac{\sqrt{14}}{2}$
 $\rightarrow x = 1 - \frac{\sqrt{14}}{2}$

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

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

الف) $5x^2 - 12x + 7 = 0 \rightarrow x^2 - 12x + 14 = 0 \rightarrow (x-7)(x-2) = 0$
 $\rightarrow x = \frac{7}{5}$
 $\rightarrow x = 1$

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

در ریشه‌ی حقیقی $\Delta > 0 \rightarrow \Delta = b^2 - 4ac \rightarrow \Delta = 15 - 12 = 3 \rightarrow \Delta > 0$ (الف) فاقد ریشه‌ی حقیقی $\Delta < 0 \rightarrow \Delta = b^2 - 4ac \rightarrow \Delta = 1 - 16 = -15 \rightarrow \Delta < 0$ (ب) دو ریشه‌ی مساوی یا یک ریشه مضاعف $\Delta = 0 \rightarrow \Delta = b^2 - 4ac \rightarrow \Delta = 16 - 16 = 0 \rightarrow \Delta = 0$ (ج) فاقد ریشه‌ی حقیقی $\Delta < 0 \rightarrow \Delta = b^2 - 4ac \rightarrow \Delta = 1 - 8 = -7 \rightarrow \Delta < 0$ (د)	۶
(الف) $\Delta > 0$ $b^2 - 4ac > 0 \rightarrow 9 - 4c > 0 \rightarrow 4c < 9 \rightarrow c < \frac{9}{4} \xrightarrow{a=c} a < \frac{9}{4}$ (ب) $\Delta = 0$ $b^2 - 4ac = 0 \rightarrow 9 - 4c = 0 \rightarrow 4c = 9 \rightarrow c = \frac{9}{4} \xrightarrow{a=c} a = \frac{9}{4}$ (ج) $\Delta < 0$ $b^2 - 4ac < 0 \rightarrow 9 - 4c < 0 \rightarrow 4c > 9 \rightarrow c > \frac{9}{4} \xrightarrow{a=c} a > \frac{9}{4}$ (د) $\Delta > 0$ $b^2 - 4ac > 0 \rightarrow 9 - 4c > 0 \rightarrow 4c < 9 \rightarrow c < \frac{9}{4} \xrightarrow{a=c} a < \frac{9}{4}$	۷
(الف) $y = x^2 + 6x + 5$ می‌بینیم داراست $a > 0 \rightarrow$ بزرگ‌ترین است $x = \frac{-b}{2a} \rightarrow x = \frac{-6}{2} = -3$ $y = \frac{-\Delta}{4a} \rightarrow y = \frac{-(36-10)}{4} = -\frac{5}{2}$ $\vec{v} = \begin{bmatrix} -3 \\ -\frac{5}{2} \end{bmatrix}$  (ب)	۸
(الف) $y = -x^2 + 4x - 3$ می‌بینیم داراست $a < 0 \rightarrow$ بزرگ‌ترین است $x = \frac{-b}{2a} \rightarrow x = \frac{-4}{-2} = 2$ $y = \frac{-\Delta}{4a} = \frac{-(16-12)}{-4} = 1$ $\vec{v} = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$  (ب) ریشه‌ی محادله: $a+b+c=0 \rightarrow x=1$ $\rightarrow x = \frac{c}{a} = 3$ بنابراین نقاط برخورد $\begin{bmatrix} 1 \\ 0 \end{bmatrix}$ و $\begin{bmatrix} 3 \\ 0 \end{bmatrix}$ است	۹
$S = \frac{-b}{a} \rightarrow S = \frac{-b}{a} = 3$ $P = \frac{c}{a} \rightarrow P = \frac{c}{a} = -2$ (الف) $S^2 - 2P = 9 + 4 = 13$ (ب) $S^2 - 3P = 9 + 6 = 15$	۱۰