

الف): $x^2 - 6x + 8 = 0 \Rightarrow x^2 - 6x + 9 = 1 \Rightarrow (x-3)^2 = 1 \Rightarrow x-3 = \pm 1$ $\Rightarrow \begin{cases} x=2 \\ x=4 \end{cases}$ ✓ ب): $x^2 + 8x + 15 = 0 \Rightarrow x^2 + 8x + 16 = 4 \Rightarrow (x+4)^2 = 4 \Rightarrow x+4 = \pm 2$ $\Rightarrow \begin{cases} x=-1 \\ x=-7 \end{cases}$ ✓ (2)	1
الف): $x^2 - 5x + 6 = 0 \Rightarrow (x-2)(x-3) = 0 \Rightarrow \begin{cases} x=2 \\ x=3 \end{cases}$ ب): $x^2 - 5x - 14 = 0 \Rightarrow (x-7)(x+2) = 0 \Rightarrow \begin{cases} x=7 \\ x=-2 \end{cases}$ ✓ (2)	2
الف): $x^2 - 3x - 4 = 0$ $\Delta = b^2 - 4ac = 9 + 16 = 25 \Rightarrow x = \frac{-b \pm \sqrt{\Delta}}{2a} \Rightarrow$ $\Rightarrow x = \frac{3 \pm \sqrt{25}}{2}$ ✓ ب): $2x^2 - 5x + \frac{1}{2} = 0$ $\Delta = b^2 - 4ac = 16 - 1 = 15 \Rightarrow x = \frac{-b \pm \sqrt{\Delta}}{2a} \Rightarrow$ $\Rightarrow x = \frac{5 \pm \sqrt{15}}{4}$ ✓ (2)	3
الف): $x^2 - 3x + 2 = 0 \Rightarrow (x-1)(x-2) = 0 \Rightarrow \begin{cases} x=1 \\ x=2 \end{cases}$ ✓ ب): $4x^2 + x - 3 = 0$ $\Delta = 1 + 48 = 49 \Rightarrow x = \frac{-b \pm \sqrt{\Delta}}{2a} \Rightarrow$ $\Rightarrow x = \frac{-1 \pm \sqrt{49}}{8} \Rightarrow \begin{cases} x = \frac{3}{4} \\ x = -1 \end{cases}$ ✓ (2)	4
الف): $4x^2 - 12x + 9 = 0 \Rightarrow x^2 - 3x + \frac{9}{4} = 0 \Rightarrow (x-\frac{3}{2})^2 = 0 \Rightarrow x = \frac{3}{2}$ ✓ ب): $3x^2 - 10x + 11 = 0 \Rightarrow x^2 - 10x + 21 = 0 \Rightarrow (x-3)(x-7) = 0 \Rightarrow x = \begin{cases} 3 \\ 7 \end{cases}$ ✓ (2)	5

 $\Delta = b^2 - 4ac$

الف) $\Delta = b^2 - 4ac = 25 - 12 = 13 \Rightarrow \Delta > 0$ دو ریشه
 ب) $\Delta = 1 - 16 = -15 \Rightarrow \Delta < 0$ صفر ریشه
 ج) $\Delta = 16 - 16 = 0 \Rightarrow \Delta = 0$ یک ریشه مضاعف
 د) $\Delta = 1 - 8 = -7 \Rightarrow \Delta < 0$ صفر ریشه

$\Delta = b^2 - 4ac = 9 - 12a$
 الف) $\Delta > 0 \Rightarrow 9 - 12a > 0 \Rightarrow a < \frac{3}{4}$
 ب) $\Delta = 0 \Rightarrow 9 - 12a = 0 \Rightarrow a = \frac{3}{4}$
 ج) $\Delta < 0 \Rightarrow 9 - 12a < 0 \Rightarrow a > \frac{3}{4}$
 د) $\Delta \geq 0 \Rightarrow 9 - 12a \geq 0 \Rightarrow a \leq \frac{3}{4}$

الف) رأس منبسط
 $x = -\frac{b}{2a} = -\frac{4}{2} = -2$
 $y = (-2)^2 + 4(-2) + 9 = 9 - 8 + 9 = 1$
 مختصات رأس: $(-2, 1)$
 ب) $(-2, 1)$

الف) رأس ماکسیمم
 $x = -\frac{b}{2a} = -\frac{4}{-2} = 2$
 $y = -2^2 + 4(2) + 9 = -4 + 8 + 9 = 13$
 مختصات رأس: $(2, 13)$
 جواب مسئله ب؟
 جواب: محور x ها را در $x = 1$ و $x = 3$ تقاطع می کند
 $-x^2 + 4x - 3 = 0 \Rightarrow \begin{cases} x = 1 \\ x = 3 \end{cases}$

$S = -\frac{b}{a} = -\frac{4}{1} = -4$ $P = \frac{c}{a} = \frac{9}{1} = 9$
 الف) $S^2 - 2P = 16 - 18 = -2$
 ب) $S^2 - 3SP = 16 - 36 = -20$