

الف) $x^2 - 4x + 1 = 0 \Rightarrow x^2 - 4x + 9 = 1 \Rightarrow (x-3)^2 = 1 \Rightarrow x-3 = \pm 1 \Rightarrow \underline{x=4} \text{ و } \underline{x=2}$	
ب) $x^2 + 12x + 17 = 0 \Rightarrow x^2 + 12x + 19 = 9 \Rightarrow (x+4)^2 = 9 \Rightarrow x+4 = \pm 3$ $\Downarrow$ $\underline{x = -1} \text{ و } \underline{x = -7}$	1
الف) $x^2 - 5x + 4 = 0 \Rightarrow (x-3)(x-2) = 0 \Rightarrow x = \text{---} + 3 \text{ و } 2$	
ب) $x^2 - 5x - 14 = 0 \Rightarrow (x-7)(x+2) = 0 \Rightarrow x = 7 \text{ و } -2$	2
الف) $x^2 - 3x - 4 = 0 \Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-4)}}{2} = \frac{3 \pm \sqrt{9 - (-16)}}{2}$	
ب) $2x^2 - 4x + \frac{1}{2} = 0 \Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(2)(\frac{1}{2})}}{4} = \frac{4 \pm \sqrt{16 - 4}}{4}$ $x = \frac{4 + \sqrt{12}}{4}, \frac{4 - \sqrt{12}}{4}$	3
الف) $x^2 - 3x + 2 = 0 \Rightarrow 1 + (-3) + 2 = 0 \Rightarrow \begin{cases} x=1 \\ x=\frac{c}{a}=2 \end{cases}$	
ب) $\underbrace{4x^2 + x - 3}_{x^2} = 0 \Rightarrow x^2 + x - 12 = 0 \Rightarrow (x+4)(x-3) = 0 \Rightarrow x = -4 \text{ و } 3$ $\div 4$ $x = -1 \text{ و } \frac{3}{4}$	4
الف) $\underbrace{5x^2 - 12x + 7}_{x^2} = 0 \Rightarrow x^2 - 12x + 34 = 0 \Rightarrow \begin{matrix} P=12 \\ S=34 \end{matrix} \Rightarrow x = 4 \text{ و } 7$ $\div 5$ $x = 1 \text{ و } \frac{7}{5}$	
ب) $\underbrace{3x^2 - 10x + 7}_{x^2} = 0 \Rightarrow x^2 - 10x + 21 = 0 \Rightarrow \begin{matrix} P=10 \\ S=21 \end{matrix} \Rightarrow x = 3 \text{ و } 7$ $\div 3$ $x = 1 \text{ و } \frac{7}{3}$	5

الف) $\Delta = b^2 - 4ac = \sqrt{25 - 4(-1)(-1)} = \sqrt{12} \xrightarrow{\Delta > 0} \text{٢ ریشه حقیقی}$

ب) $\Delta = b^2 - 4ac = \frac{(-1)^2 - 4(2)(2)}{1} = \sqrt{-15} \xrightarrow{\Delta < 0} \text{٥ ریشه حقیقی}$

ج) $\Delta = b^2 - 4ac = 14 - 4(2)(2) = 0 \xrightarrow{\Delta = 0} \text{١ ریشه حقیقی}$

د) $\Delta = b^2 - 4ac = 1 - \frac{4(2)(1)}{-1} = -7 \xrightarrow{\Delta < 0} \text{٥ ریشه حقیقی}$

$2x^2 - 3x + a = 0 \Rightarrow \Delta = b^2 - 4ac = 9 - \frac{4 \times 2 \times a}{1 \times 2} \Rightarrow \Delta = 9 - 4a$

الف) $9 - 4a > 0 \Rightarrow 9 > 4a \Rightarrow \left\{ \frac{9}{4} > a \right\}$

ب) $9 - 4a = 0 \Rightarrow \left\{ a = \frac{9}{4} \right\}$

ج) $9 - 4a < 0 \Rightarrow 9 < 4a \Rightarrow \left\{ \frac{9}{4} < a \right\}$

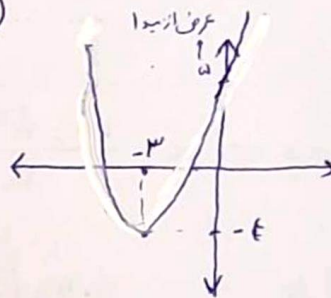
د) $9 - 4a \geq 0 \Rightarrow 9 \geq 4a \Rightarrow \left\{ \frac{9}{4} \geq a \right\}$

الف) $y = x^2 + 4x + a \rightarrow \textcircled{1} a > 0 \rightarrow \min$

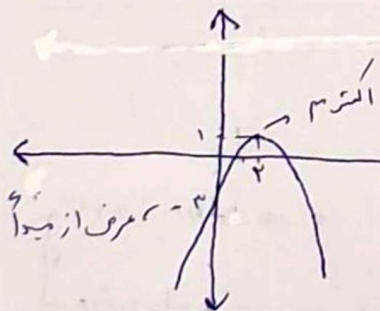
$\textcircled{1} x = \frac{-b}{2a} = \frac{-4}{2} = -2, y = \frac{4 + (-16) + a}{-2} = -2$

الترسم $\Rightarrow \min, \begin{vmatrix} -2 \\ -2 \end{vmatrix}$

ب)



الف) $y = -x^2 + 4x - 3 \rightarrow \textcircled{1} a < 0 \rightarrow \max, \textcircled{2} x = \frac{-b}{2a} = \frac{-4}{-2} = 2, y = -4 + 8 - 3 = 1$



الترسم $\Rightarrow \max, \begin{vmatrix} 2 \\ 1 \end{vmatrix}$

هون ریشه ها را ب $-x^2 + 4x - 3 = 0$
 $-1 + 4 - 3 = 0 \Rightarrow \begin{cases} x = 1 \\ x = \frac{3}{1} = 3 \end{cases}$

$x^2 - 3x - 2 = 0 \Rightarrow \begin{matrix} p = 2 \\ s = -2 \end{matrix}$
 $x^2 - 5x + p = 0$

$s = 2$
 $p = -2$

الف) ۱۳ ب) ۱۴

الف) $(2)^2 - 2 \times 3 = 4 - 6 = -2$

ب) $(-2)^2 - 3(-2)(3) = 4 + 18 = 22$