

الف) $x^2 - 4x + 8 = 0 \xrightarrow{(41)} x^2 - 4x + 9 = 1 \rightarrow (x-2)^2 = 1$
 $x - 2 = \pm 1 \rightarrow \begin{cases} x = 3 \\ x = 1 \end{cases}$

ب) $x^2 + 8x + 7 = 0 \xrightarrow{(19)} x^2 + 8x + 14 = 9 \rightarrow (x+4)^2 = 9$
 $x + 4 = \pm 3 \rightarrow \begin{cases} x = -1 \\ x = -7 \end{cases}$

الف) $x^2 - 5x + 4 = 0 \rightarrow (x-2)(x-3) = 0 \rightarrow \begin{cases} x = 2 \\ x = 3 \end{cases}$

ب) $x^2 - 5x - 14 = 0 \rightarrow (x-7)(x+2) = 0 \rightarrow \begin{cases} x = 7 \\ x = -2 \end{cases}$

الف) $x^2 - 3x - 4 = 0 \rightarrow x \rightarrow \begin{cases} \frac{3 + \sqrt{29}}{2} \\ \frac{3 - \sqrt{29}}{2} \end{cases}$
 $\Delta = (-3)^2 - 4 \times 1 \times (-4) = 29$

ب) $2x^2 - 4x + \frac{1}{2} = 0 \rightarrow x \rightarrow \begin{cases} \frac{4 + \sqrt{12}}{4} = 1 + \frac{\sqrt{3}}{2} \\ \frac{4 - \sqrt{12}}{4} = 1 - \frac{\sqrt{3}}{2} \end{cases}$
 $\Delta = (-4)^2 - 4 \times 2 \times \frac{1}{2} = 12$

$x = \frac{-b \pm \sqrt{\Delta}}{2a}$
 $\Delta = b^2 - 4ac$

الف) $x^2 - 3x + 2 = 0 \rightarrow x \rightarrow \begin{cases} 1 \\ \frac{c}{a} = 2 \end{cases}$
 مجموع (این) = 3 = صفر

ب) $\underbrace{x^2 + x - 2}_{a+c=b} = 0 \rightarrow x \rightarrow \begin{cases} -1 \\ \frac{-c}{a} = \frac{2}{1} \end{cases}$

نکته: $a+b+c=0 \rightarrow x=1, \frac{c}{a}$
 $a+c=b \rightarrow x=-1, \frac{-c}{a}$

الف) $5x^2 - 12x + 7 = 0 \rightarrow x^2 - (2x + 3) = 0$
 $\rightarrow (x-3)(x-1) = 0 \rightarrow \begin{cases} x = 3 \xrightarrow{\pm 3} \boxed{1, 4} \\ x = 1 \xrightarrow{\pm 1} \boxed{1} \end{cases}$

ب) $3x^2 - 10x + 7 = 0 \rightarrow x^2 - 10x + 21 = 0$
 $\rightarrow (x-3)(x-7) = 0 \rightarrow \begin{cases} x = 7 \xrightarrow{\pm 7} \boxed{\frac{7}{3}} \\ x = 3 \xrightarrow{\pm 3} \boxed{1} \end{cases}$

$$الف) \quad x^2 + 4x - 1 = 0 \rightarrow \Delta = 4^2 - 4 \times (-1) \times (-1) = 12 \rightarrow + \bar{\Delta} \Rightarrow \boxed{\text{دو ریشه}}$$

$$ب) \quad x^2 - x + 2 = 0 \rightarrow \Delta = (-1)^2 - 4 \times 1 \times 2 = -7 \rightarrow - \bar{\Delta} \Rightarrow \boxed{\text{بدون ریشه}}$$

$$ج) \quad x^2 - 4x + 4 = 0 \rightarrow \Delta = (-4)^2 - 4 \times 1 \times 4 = 0 \rightarrow 0 \bar{\Delta} \Rightarrow \boxed{\text{ارزش مفاعف}}$$

$$د) \quad x^2 - x + 1 = 0 \rightarrow \Delta = (-1)^2 - 4 \times 1 \times 1 = -3 \rightarrow - \bar{\Delta} \Rightarrow \boxed{\text{بدون ریشه}}$$

$$x^2 - 3x + a = 0 \rightarrow \Delta = (-3)^2 - 4 \times 1 \times a = 9 - 4a$$

$$الف) \quad 9 - 4a > 0 \rightarrow + \bar{\Delta} \rightarrow \boxed{a < \frac{9}{4}}$$

$$ب) \quad 9 - 4a = 0 \rightarrow 0 \bar{\Delta} \rightarrow \boxed{a = \frac{9}{4}}$$

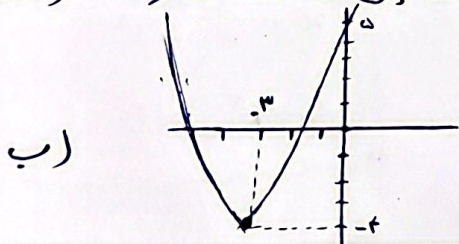
$$ج) \quad 9 - 4a < 0 \rightarrow - \bar{\Delta} \rightarrow \boxed{a > \frac{9}{4}}$$

$$د) \quad 9 - 4a \geq 0 \rightarrow \bar{\Delta} \text{ ناسی} \rightarrow \boxed{a \leq \frac{9}{4}}$$

$$y = x^2 + 4x + 5$$

$$الف) \quad a > 0 \rightarrow + \text{س} \Rightarrow \underline{\underline{Min}}$$

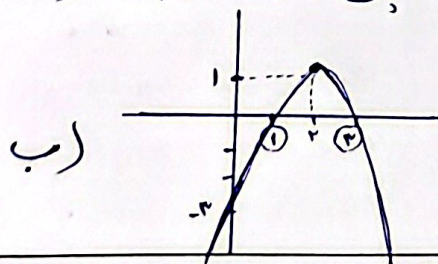
$$\left. \begin{array}{l} x \rightarrow \frac{-b}{2a} \Rightarrow \frac{-4}{2} = -2 \\ y \rightarrow \frac{-\Delta}{4a} \Rightarrow \frac{14-16}{4} = -\frac{1}{2} \end{array} \right\} \boxed{\text{ext} \left| \begin{array}{l} -2 \\ -\frac{1}{2} \end{array} \right.}$$



$$y = -x^2 + 4x - 3$$

$$الف) \quad a < 0 \rightarrow - \text{س} \Rightarrow \underline{\underline{Max}}$$

$$\left. \begin{array}{l} x \rightarrow \frac{-b}{2a} \Rightarrow \frac{-4}{-2} = 2 \\ y \rightarrow \frac{-\Delta}{4a} \Rightarrow \frac{14-12}{-4} = -\frac{1}{2} \end{array} \right\} \boxed{\text{ext} \left| \begin{array}{l} 2 \\ -\frac{1}{2} \end{array} \right.}$$



$$\text{بقا} \rightarrow \boxed{x=1, 3}$$

$$x^2 - 3x - 2 = 0 \quad S = \frac{-b}{a} \rightarrow \frac{-(-3)}{1} = 3$$

$$P = \frac{c}{a} \rightarrow \frac{-2}{1} = -2$$

$$الف) \quad 3^2 - 3 \times (-2) = 9 + 6 = \boxed{15}$$

$$ب) \quad 3^3 - 3 \times 3 \times (-2) = 27 + 18 = \boxed{45}$$