

$$x^2 - 4x + 1 = 0 \rightarrow x^2 - 4x + 1 + 1 = 1 \rightarrow x^2 - 4x + 4 = 1$$

$$(x-2)^2 = 1 \rightarrow x-2 = \pm 1 \rightarrow x \begin{cases} x=3 \\ x=1 \end{cases}$$

$$x^2 + 11x + 17 = 0 \rightarrow x^2 + 11x + 17 + 9 = 9 \rightarrow x^2 + 11x + 14 = 9$$

$$(x+7)^2 = 9 \rightarrow x+7 = \pm 3 \rightarrow x \begin{cases} x=-4 \\ x=-10 \end{cases}$$

$$x^2 - 5x + 4 = 0 \rightarrow (x-1)(x-4) = 0 \Rightarrow \begin{cases} x=1 \\ x=4 \end{cases}$$

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

$$x^2 - 3x - 5 = 0 \rightarrow \Delta = b^2 - 4ac = (-3)^2 - 4(1)(-5) = 29$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} \rightarrow x = \frac{3 \pm \sqrt{29}}{2}, \frac{3 - \sqrt{29}}{2}$$

$$2x^2 - 4x + \frac{1}{2} = 0 \rightarrow \Delta = b^2 - 4ac = (-4)^2 - 4(2)(\frac{1}{2}) = 12$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} \rightarrow x = \frac{4 \pm \sqrt{12}}{4} = 1 + \frac{\sqrt{3}}{2}, x = \frac{4 - \sqrt{12}}{4} = 1 - \frac{\sqrt{3}}{2}$$

$$x^2 - 3x + 2 = 0 \Rightarrow a+b+c=0 \Rightarrow \begin{cases} x=1 \\ x=\frac{c}{a}=2 \end{cases}$$

$$2x^2 + x - 3 = 0 \Rightarrow a+c=b \Rightarrow \begin{cases} x=-1 \\ x=\frac{-c}{a} = \frac{3}{2} \end{cases}$$

$$\Delta x^2 - 12x + 17 = 0 \rightarrow x^2 - 12x + 3\Delta = 0 \rightarrow (x-4)(x-\Delta) = 0 \Rightarrow \begin{cases} x=4 \\ x=\Delta \end{cases}$$

$$x=4 \xrightarrow{\div \Delta} \boxed{x=1, \frac{1}{\Delta}} \quad x=\Delta \xrightarrow{\div \Delta} \boxed{x=1}$$

$$2x^2 - 10x + 17 = 0 \rightarrow x^2 - 10x + 21 = 0 \rightarrow (x-3)(x-7) = 0 \Rightarrow \begin{cases} x=3 \\ x=7 \end{cases}$$

$$x=4 \xrightarrow{\div 2} \boxed{x=2, \frac{1}{2}} \quad x=7 \xrightarrow{\div 2} \boxed{x=3, \frac{1}{2}}$$

$-3x^2 + 5x - 1 = 0 \rightarrow \Delta = b^2 - 4ac = (5)^2 - 4(-3)(-1) = 13 \rightarrow$ دلتا مثبت $\rightarrow$ ۲ ریشه
 $2x^2 - x + 2 = 0 \rightarrow \Delta = (-1)^2 - 4(2)(2) = -15 \rightarrow$ دلتا منفی $\rightarrow$ بدون ریشه
 $2x^2 - 4x + 2 = 0 \rightarrow \Delta = (-4)^2 - 4(2)(2) = 0 \rightarrow$ دلتا صفر $\rightarrow$ یک ریشه مضاعف
 $2x^2 - x + 1 = 0 \rightarrow \Delta = (-1)^2 - 4(2)(1) = -7 \rightarrow$ دلتا منفی $\rightarrow$ بدون ریشه

$$\Delta = (-3)^2 - 4(2)(a) = 9 - 8a$$

الف $9 - 8a > 0 \rightarrow a < \frac{9}{8}$ دلتا مثبت $\rightarrow$ ۲ جواب متمایز

ب $9 - 8a = 0 \rightarrow a = \frac{9}{8}$ دلتا صفر $\rightarrow$ یک ریشه مضاعف

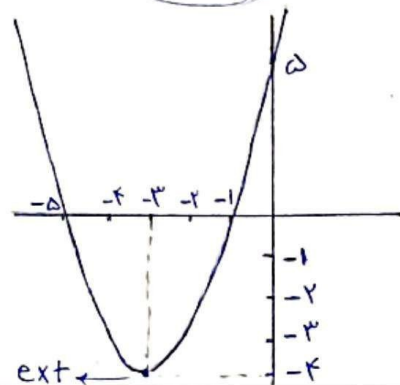
ج $9 - 8a < 0 \rightarrow a > \frac{9}{8}$ دلتا منفی $\rightarrow$ فاقد ریشه

د $9 - 8a \geq 0 \rightarrow a \leq \frac{9}{8}$ دلتا نامنفی $\rightarrow$ ریشه داشته باشد

$a \Rightarrow$ (min) تابع مینیمم دارد $\Rightarrow$ مثبت

ext: $\left| \begin{array}{l} -b \\ 2a \end{array} \right| \rightarrow \frac{-4}{2} = -3$
 $y \rightarrow (-3)^2 - 1(-3) + 5 = -4$

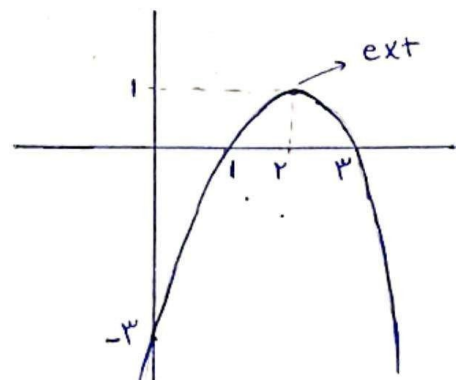
$\Rightarrow$ ext: $\left| \begin{array}{l} -3 \\ -4 \end{array} \right|$ ریشه ها $\rightarrow -1, -5$



$a \Rightarrow$ (max) تابع ماکسیمم دارد $\Rightarrow$ منفی

ext: $\left| \begin{array}{l} -b \\ 2a \end{array} \right| \rightarrow \frac{-4}{-2} = 2$
 $y \rightarrow -4 + 1(-2) - 3 = 1$

$\Rightarrow$ ext: $\left| \begin{array}{l} 2 \\ 1 \end{array} \right|$ ریشه ها $\rightarrow 1, 3$



$S = \frac{-b}{a} / P = \frac{c}{a}$
 $S = \frac{-(-3)}{1} = 3$
 $P = \frac{-2}{1} = -2$

$S^2 - 2P = 3^2 - 2(-2) = 9 + 4 = 13$

$S^3 - 3SP = 3^3 - 3(3)(-2) = 27 + 18 = 45$