

$$\text{الف) } x^2 - 4x + 9 = 1 \rightarrow (x-3)^2 = 1 \rightarrow x-3 = \pm 1$$

$$\begin{cases} x = 4 \\ x = 2 \end{cases}$$

$$\rightarrow x^2 + 14x + 49 = 9 \rightarrow (x+7)^2 = 9$$

$$x+7 = \pm 9 \quad \begin{cases} x = 2 \\ x = 16 \end{cases}$$

$$\text{الف) } x^2 - 5x + 6 = 0 \rightarrow (x-2)(x-3) = 0 \quad \begin{cases} x = 2 \\ x = 3 \end{cases}$$

$$\rightarrow x^2 - 5x + 6 = 0 \rightarrow (x-5)(x+2) = 0 \quad \begin{cases} x = 5 \\ x = -2 \end{cases}$$

$$\text{الف) } x^2 - 3x - 4 = 0 \quad x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \rightarrow \sqrt{\Delta} = \sqrt{b^2 - 4ac}$$

$$\sqrt{\Delta} = \sqrt{9 - (4)(1)(-4)} = \sqrt{9 + 16} = \sqrt{25} = 5$$

$$x = \frac{3 \pm 5}{2} \quad x = \frac{3+5}{2} = 4, \quad x = \frac{3-5}{2} = -1$$

$$\text{الف) } x^2 - 3x + 2 = 0 \rightarrow ax^2 + bx + c = 0 \rightarrow a + c + b = 0 \rightarrow \begin{cases} x = 1 \\ x = \frac{c}{a} = \frac{2}{1} = 2 \end{cases}$$

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

$$\text{الف) } x^2 - 12x + 36 = 0 \rightarrow (x-6)^2 = 0 \rightarrow x-6 = 0 \rightarrow x = 6$$

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

الف)  $\Delta = b^2 - 4ac = 2^2 + (-4)(-3)(-1) = 13$   $u = \frac{-b \pm \sqrt{\Delta}}{2a}$

→  $\Delta = b^2 - 4ac = 1 + (-4)(2)(2) = -15$

$u = \frac{-5 - \sqrt{13}}{-4}$  ,  $u = \frac{-5 + \sqrt{13}}{-4}$

→  $\Delta = b^2 - 4ac = 19 + (-4)(2)(2) = 0$

جواب دلت منفی است و در مجموعه اعداد حقیقی ندارد

→  $\Delta = b^2 - 4ac = 1 + (-4)(2)(1) = -7$

جواب دلت صفر است پس دو ریشه مساوی یا یک ریشه مضاعف دارد. ریشه مساوی دارد.

$b + a + c = 0 \rightarrow u = 1$  ,  $u = \frac{c}{a} = \frac{1}{2} = 0.5$

$2u^2 - 3u + a = 0$

(الف)

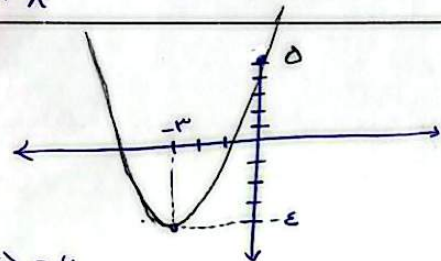
$2u^2 - 3u + a = 0 \rightarrow \Delta = b^2 - 4ac = 9 + (-4)(2)(a) = 9 - 8a$

$9 - 8a = 0 \rightarrow a = \frac{9}{8}$  (ب)

د) ریشه‌ها داشته باشند یعنی  $\Delta \geq 0$   
پس  $a \leq \frac{9}{8}$

ج)  $a > \frac{9}{8}$  (ج)  
پس  $a < \frac{9}{8}$  (د)

$y = u^2 + 4u + a$



$au^2 + bu + c$   $y$   $a > 0$   
 $u^2 + 4u + a$

$u^2 + 4u + a = y$

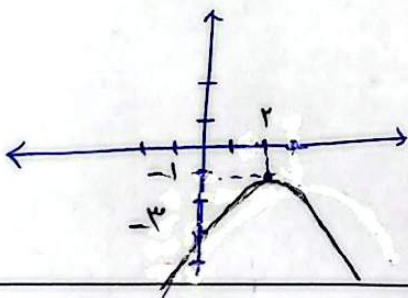
و جهت تابع  $a > 0$  تابع مستقیم و دایره‌ای

$\min \left| y = -\frac{\Delta}{4a} = -\frac{(b^2 - 4ac)}{4a} = -\frac{16}{8} = -2 \right.$   
 $u = -\frac{b}{2a} = -\frac{4}{2} = -2$

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

$au^2 + bu + c$   $y$   $a < 0$   
 $-u^2 + 4u - 3$

و جهت تابع  $a < 0$  تابع مستقیم و دایره‌ای



$\max \left| y = -\frac{\Delta}{4a} = -\frac{(b^2 - 4ac)}{4a} = \frac{16}{-4} = -4 \right.$   
 $u = -\frac{b}{2a} = -\frac{4}{-2} = 2$

الف)  $S^2 - 2P = \left(-\frac{b}{a}\right)^2 + \left(-\frac{c}{a}\right) = \left(-\frac{3}{1}\right)^2 + \left(-\frac{1}{1}\right) = 9 - 1 = 8$

ب)  $S^3 - 3PS = \left(-\frac{b}{a}\right)^3 + (-3)\left(-\frac{c}{a}\right)\left(-\frac{b}{a}\right) = \left(-\frac{3}{1}\right)^3 + (-3)\left(-\frac{1}{1}\right)\left(-\frac{3}{1}\right) = -27 + 9 = -18$