

سوال ۱)  $\frac{-b}{2a} = -1 \rightarrow b = 2a$       فرض:  $\frac{-\Delta}{2a} = \frac{-b^2 + 4ac}{4a} = \frac{-4a^2 + 4ac}{4a} = \frac{4a(c-a)}{4a} = c-a = 9$   
 $c = a+9$

$y = ax^2 + 2ax + a+9 \xrightarrow{(1,1)} 1 = 9a + 4a + a + 9 \rightarrow 14a = -8 \rightarrow a = -\frac{1}{2}$

$y = -\frac{1}{2}x^2 - x + \frac{17}{2}$

سوال ۲)  $\Delta > 0 \rightarrow b^2 - 4ac > 0 \rightarrow m^2 - 4(2)(m+4) > 0$        $m^2 - 8m - 32 > 0$   
 $(m-12)(m+4) > 0$        $\begin{array}{c} -4 \quad 12 \\ + \quad | \quad - \quad | \quad + \end{array}$

$S > 0 \rightarrow \frac{-b}{a} > 0 \rightarrow \frac{-m}{2} > 0 \rightarrow m < 0$

$P > 0 \rightarrow \frac{c}{a} > 0 \rightarrow \frac{m+4}{2} > 0 \rightarrow m > -4$       جواب:  $(-4, -2) \rightarrow$  انزاد

سوال ۳)  $S = \frac{b}{a}$        $P = \frac{c}{a} \xrightarrow{\text{عکس}} \frac{a}{c}$        $\frac{-b}{a} = \frac{a}{c} \rightarrow a^2 = -bc$

$\Delta > 0 \rightarrow b^2 - 4ac > 0$        $9 = -(2m-1)(2-m) = 2m^2 - 4m + 2$

$m = -1 \rightarrow (2(-1)-1)^2 - 4(2)(2-(-1)) = -27 < 0$  غ ق ق غ       $2m^2 - 4m - 7 = 0 \xrightarrow{\text{دوسی}} m^2 - 2m - 1 = 0 \rightarrow (m-3)(m+1) = 0$

$m = \frac{3}{2} \rightarrow (2(\frac{3}{2})-1)^2 - 4(2)(2-\frac{3}{2}) = 2 > 0$  ✓  $\rightarrow$  پس  $\frac{3}{2}$  قابل قبول است       $\frac{3}{2}, -\frac{1}{2}$  ✓

سوال ۴)  $x^2 - Sx + P = 0$        $S = x_1 + x_2 + \frac{1}{x_1} + \frac{1}{x_2} = (x_1 + x_2)^2 - 2x_1x_2(x_1 + x_2) + \frac{x_1 + x_2}{x_1x_2}$

$P = (x_1 + \frac{1}{x_1})(x_2 + \frac{1}{x_2}) = (x_1x_2)^2 + x_1^2 + x_2^2 + \frac{1}{x_1x_2} = (x_1x_2)^2 + (x_1 + x_2)^2 - 2x_1x_2 + \frac{1}{x_1x_2}$

$x^2 - x - 4 = 0 \rightarrow x_1x_2 = \frac{c}{a} = -4$        $x_1 + x_2 = \frac{-b}{a} = 1$

$S = 1^2 - 2(-4)(1) + \frac{1}{-4} = \frac{21}{4}$        $P = (-4)^2 + 1^2 - 2(-4) + \frac{1}{-4} = \frac{-221}{4}$

$x^2 - \frac{21}{4}x - \frac{221}{4} = 0$

سوال ۵)  $\sqrt{x^2} - \sqrt{x^2} + 1 - \frac{1}{\sqrt{x^2}} + \sqrt{x^2} - 1 = \sqrt{x^2} - \frac{1}{\sqrt{x^2}} = \frac{\sqrt{x^2} - 1}{\sqrt{x^2}} \rightarrow \frac{x^2 - 1}{\sqrt{x^2}} = 2\sqrt{x^2}$

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

سوال ۶) فرض:  $\alpha, 3\alpha$        $P = 3\alpha^2$        $S = 4\alpha$

$P = \frac{c}{a} = \frac{c}{4} = 3\alpha^2 \rightarrow \alpha^2 = \frac{c}{12} \rightarrow \alpha = \pm \frac{\sqrt{c}}{2\sqrt{3}}$        $S = \frac{-b}{a} = \frac{-a}{4} = 4\alpha \rightarrow \begin{cases} \alpha = \frac{1}{4} & a = 1 \\ \alpha = -\frac{1}{4} & a = -1 \end{cases}$

اختلاف:  $1 - (-1) = 2$

$$a > 0 \quad \Delta = b^2 - 4ac = (r+ra)^2 \gg 0 \rightarrow \frac{-b}{a} \gg 0 \quad \frac{-(r+ra)}{a} \gg 0 \quad \frac{-r}{-r+1} < 0 \quad (\text{سوال 7})$$

$$(0, +\infty) \cap \left[-\frac{r}{r+1}, 0\right) = \emptyset$$

مجموعه جواب:  $x = \frac{-b}{r} \rightarrow \frac{-a}{r} = \frac{-(r)}{-r} \rightarrow a = r$  (سوال 8)

$$y = 1 \rightarrow \begin{cases} 1 = x^2 + rx - r \\ x^2 + rx - r = 0 \end{cases} \quad \begin{cases} 1 = -x^2 - rx + b \\ x^2 + rx - b + 1 = 0 \end{cases} \quad \left\{ \begin{array}{l} x^2 + rx - r = x^2 + rx - b + 1 \\ -r = -b + 1 \rightarrow b = r \end{array} \right. \quad ab = rxr = \underline{r^2}$$

$$2ax^2 + ax - 4 = 0 \rightarrow S_1 = \frac{-a}{2a} = -\frac{1}{2} \quad rx^2 - ax + b = 0 \rightarrow S_2 = \frac{a}{r} = S_1 + \frac{1}{r} + \frac{1}{r} \rightarrow a = 1 \quad (\text{سوال 9})$$

(ریشه:  $\alpha, \beta$ )

$$P_1 = \frac{-4}{2 \times 1} = -2 \quad P_2 = \left(x + \frac{1}{r}\right)\left(\beta + \frac{1}{r}\right) = \alpha\beta + \frac{\alpha + \beta}{r} + \frac{1}{r^2} = (-2) + \frac{-\frac{1}{2}}{r} + \frac{1}{r^2} = -2 \quad P_2 = \frac{b}{r} = -2 \quad b = -4$$

$$\left[\frac{ab}{r}\right] = \left[\frac{1 \times (-4)}{r}\right] = \underline{-4}$$

ریشه مشترک:  $\alpha$   $\left. \begin{array}{l} \alpha^2 + 4\alpha + m = 0 \\ \alpha^2 + 2\alpha - 3m = 0 \end{array} \right\} \rightarrow \begin{array}{l} \alpha^2 + 4\alpha + m = \alpha^2 + 2\alpha - 3m \\ \alpha = -4m \\ \alpha = -m \end{array}$  (سوال 10)

جایگزینی:  $(-m)^2 + 4(-m) + m = 0 \rightarrow m^2 - 3m = 0$   
 $m(m-3) = 0 \left\{ \begin{array}{l} m = 0 \text{ غلط} \\ m = 3 \end{array} \right.$

$$x^2 + 4x + m = 0$$

$$(x+1)(x+3) = 0 \rightarrow \begin{cases} x = -1 \\ x = -3 \end{cases}$$

$$x^2 + 2x - 12 = 0$$

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

اطلاعات ریشه‌های غیر مشترک:  $3 - (-1) = 4$