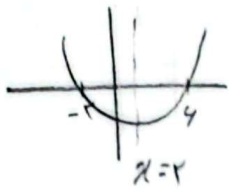


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$$x_5 = 2 \rightarrow \frac{-1}{2a-2} = 2 \Rightarrow 2a-2 = -1 \Rightarrow a = \frac{3}{2}$$

$$y = -\frac{1}{2}x^2 + x + 3 \Rightarrow -x^2 + 2x + 6 = 0 \Rightarrow (x-4)(x+2) = 0$$

$$\boxed{x=4} \quad \checkmark \quad x$$

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$$f(x) = mx^2 - 2x + m$$

$$\frac{x_1 \quad x_2}{f(x) = -1 + 1 - 1 = -1}$$

$$\frac{c}{a} = \frac{m}{m} = 1 \Rightarrow \frac{c}{a} > 0 \rightarrow \text{دوربین هم علامت}$$

$$\Rightarrow \begin{cases} a < 0 \rightarrow c < 0 \\ m < 0 \end{cases}$$

$$\Delta > 0 \rightarrow 4 - 4m^2 \geq 0 \rightarrow -\frac{1}{2} \leq m \leq \frac{1}{2}$$

$$\left\{ -\frac{1}{2} \leq m < 0 \right.$$



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$$\alpha = \frac{3-\sqrt{5}}{2}, \beta = \frac{3+\sqrt{5}}{2}$$

$$\Rightarrow \alpha\beta = \frac{9-5}{4} = \frac{1}{4} \quad \alpha + \beta = 3$$

$$\left\{ \begin{aligned} x^2 - 3x + p &= 0 \\ x^2 - 2x + \frac{1}{4} &= 0 \end{aligned} \right.$$

ضرایب صحیح

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$$2x^2 - 8x + m + 2 = 0, \alpha < \beta \Rightarrow \alpha + \beta = 4$$

$$2\alpha^2 + 2\beta^2 = 12 \quad \alpha\beta = \frac{m+2}{2}$$

$$\begin{aligned} 2\alpha^2 - 8\alpha + m + 2 &= 0 \\ 2\beta^2 - 8\beta + m + 2 &= 0 \end{aligned}$$

$$2(\alpha^2 + \beta^2) - 8(\alpha + \beta) + 2m + 4 = 0 \Rightarrow 2(4 + 4) - 8(4) + 2m + 4 = 0 \Rightarrow 2m - 8 = 0 \Rightarrow m = 4$$

$$m = 4$$

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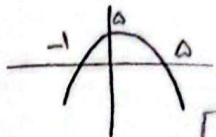
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$$y = a(x - x_5)^2 + y_5$$

$$y = a(x - 2)^2 + 9 \xrightarrow{x=0} 0 = 4a + 9 \Rightarrow a = -\frac{9}{4}$$

$$\left\{ \begin{aligned} y &= -(x-2)^2 + 9 \\ y &= -x^2 + 4x + 5 \end{aligned} \right.$$

$$-x^2 + 4x + 5 = 0 \Rightarrow (x-5)(x+1) = 0$$



$$\boxed{-1 < x < 5}$$

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$$\alpha x^r - v x + q\beta = 0$$

$$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha + \beta}{\alpha\beta} = \frac{-r + \frac{r}{r}}{-r \times \frac{1}{r}} = \frac{-r}{-r} = \frac{v}{q}$$

$$\alpha + \beta = \frac{v}{\alpha}$$

$$\alpha\beta = \frac{q\beta}{\alpha} \rightarrow \alpha^r\beta = q\beta \quad \begin{cases} \alpha = -r: -r + \beta = -\frac{v}{r} \Rightarrow \beta = \frac{r}{r} \checkmark \\ \alpha = r: r + \beta = \frac{v}{r} \Rightarrow \beta = -\frac{r}{r} \times \end{cases}$$

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$$x^r + m x - r m = 0 \Rightarrow \alpha + \beta = -m$$

$$\alpha^r - m\beta = 1$$

$$\alpha^r + m\alpha - r m = 0 \rightarrow \alpha^r = r m - m\alpha$$

$$\begin{cases} r m - m\alpha - m\beta = 1 \\ r m - m(\alpha + \beta) = 1 \\ -m = 1 \end{cases}$$

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$$m = -1: x^r - x + 1 = 0 \quad \Delta < 0 \quad \times$$

$$m = r: x^r + r x - r = 0 \quad \Delta > 0 \quad \checkmark$$

$$r m + m r + 1 = 0$$

$$(m + r)(m - r) = 0$$

$$\rightarrow \frac{-b}{a} = \frac{r}{1} = -r \Rightarrow \boxed{\alpha + \beta = -r}$$

$$f(x) = m x^r + \xi x + \frac{m}{r} + v$$

$$y_s = -\frac{\Delta}{\xi a} \Rightarrow 1 = \frac{-(14 - r m^r - r \Lambda m)}{\xi m} \Rightarrow r m^r + r \Lambda m - 14 = r r m$$

$$m = -r \rightarrow y = -r x^r + \xi x + q \rightarrow x = r \rightarrow \boxed{x = r}$$

$$m = \xi \rightarrow y = \xi x^r + \xi x + q$$

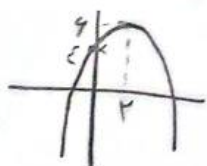
$$\Delta < 0 \quad \times$$

$$r m^r - \xi m - 14 = 0$$

$$m < -r$$

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$$y = a(x - x_s)^r + y_s$$

$$y = a(x - r)^r + q$$

$$x = 0, y = 4$$

$$\begin{cases} \xi a + q = \xi \\ a = -\frac{1}{r} \end{cases}$$

$$y = -\frac{1}{r}(x - r)^r + q \rightarrow y = -\frac{1}{r}x^r + x + \xi$$

$$x^r - r x - 1$$

$$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha + \beta}{\alpha\beta} = \frac{r}{-1} = -\frac{r}{1} = -\frac{1}{r}$$

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$$x^r(\xi a + \xi)x + r a r + q a + r = 0 \xrightarrow{x=r} \xi - 1a - 1 + r a r + q a + r = 0$$

$$r a^r - r a - 1 = 0 \rightarrow \frac{r \pm \xi}{r \times r} \quad \begin{cases} a = 1 \\ a = -\frac{1}{r} \end{cases}$$

$$a = 1 \rightarrow x^r - 1x + 1r = 0 \rightarrow (x - r)(x - 4) = 0 \rightarrow \boxed{x = 4}, x = r$$

$$a = -\frac{1}{r} \rightarrow x^r - \frac{1}{r}x + \frac{\xi}{r} = 0 \rightarrow \boxed{x = \frac{r}{r}}, x = r$$

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