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الف)  $a > 0 \rightarrow \min$

$$x = \frac{-b}{2a} = \frac{-2}{4} = -\frac{1}{2}$$

$$y = \left( x \times \frac{1}{2a} \right) - \frac{c}{4a} = -\frac{1}{4}$$

$$\frac{c}{a} = 0$$



ب)  $a < 0 \rightarrow \max$

$$x = \frac{-b}{2a} = \frac{-2}{-4} = \frac{1}{2}$$

$$y = -\frac{1}{4} + 1 = \frac{3}{4}$$

$$\frac{c}{a} = 0$$

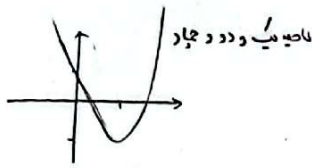


الف)  $a > 0 \rightarrow \min$

$$\frac{-b}{2a} = \frac{2}{4}$$

$$y = -\frac{1}{4}$$

عین است

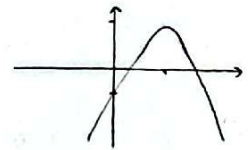


ب)  $a < 0 \rightarrow \max$

$$x = \frac{-b}{2a} = \frac{-2}{-4} = \frac{1}{2}$$

$$y = \frac{3}{4}$$

عین است



عین است

الف)  $x^2 - x - 3 = 0$

الف)  $\frac{\alpha + \beta}{\alpha - \beta} = \frac{-\frac{b}{a}}{\frac{c}{a}} = 1$

$$= \frac{1}{\sqrt{13}}$$

ج)  $x^2 + 3^2 \rightarrow (\alpha + \beta)(\alpha - \alpha\beta + \beta^2) = 10$

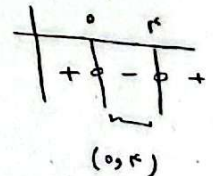
د)  $x^2 - 3^2 \rightarrow (\alpha - \beta)(\alpha^2 + \alpha\beta + \beta^2) = 4\sqrt{13}$

ب)  $(\alpha + \beta)^2 = 1 \rightarrow \alpha^2 + \beta^2 + 2\alpha\beta = 1 \rightarrow \alpha^2 + \beta^2 = 1 - 2\alpha\beta$   
 $2 \times \frac{c}{a} = -4$

\* الف)  $y = (x-2)(x^2 - ax + a) \rightarrow x^2 - ax + a$

$$\Delta = b^2 - 4ac \rightarrow a^2 - (4 \times 1 \times a) \rightarrow a^2 - 4a < 0$$

$$a(a-4) < 0 \rightarrow \begin{cases} a < 0 \\ a > 4 \end{cases}$$



$$a \in (0, 4]$$

\* اما از طرفی  $x^2 - ax + a$  میباید ریشه‌های  $x$  داشته باشد  $\rightarrow a > 4$

الف)  $2x^2 - 12x - a = 0 \rightarrow x^2 - 6x = \frac{a}{2}$

$$2x^2 + 3^2 - fa = v \rightarrow \alpha^2 + \beta^2 = 14 + \frac{fa}{2}$$

$$\alpha^2 + \alpha^2 + \beta^2 - fa = v$$

$$14 + \frac{fa}{2} + \frac{a}{2} = v \rightarrow 14 + a = v \rightarrow a = -4$$

$$2x^2 - 12x + 9 = 0$$

$$x^2 - 12x + 27 = 0 \rightarrow (x-3)(x-9)$$

$$\frac{f}{f} = 1 \quad \frac{a}{f} = 2 \rightarrow \frac{a}{2} = \frac{-4}{2} = -2$$

8)  $(b, b-r) \rightarrow \omega$

$ra + r + v - ra = 10 \rightarrow \frac{10}{r} = \omega = b \rightarrow (2, r)$

$$\begin{cases} v-ra \geq 1 \rightarrow 4 \geq ra - r \geq a \\ a-r \geq 1 \rightarrow a \geq r \end{cases} \rightarrow a=r \begin{cases} v-ra = 1 \\ a-r = 1 \\ ra+r = 9 \end{cases}$$

$(1,1) (9,1) \rightarrow \frac{-ra+rf}{\Delta} = -\frac{1}{\Delta}$

9)  $ax^r - ax - b = 0 \xrightarrow{x=\beta} a\beta^r - a\beta - b = 0 \rightarrow \beta^r = \beta + \frac{b}{a}$   
 $x^r = x + \frac{b}{a}$   
 $r_0(\beta + \frac{b}{a}) + r_0(\alpha + \frac{b}{a}) - r_0\beta = 1v$   
 $r_0\beta + \frac{r_0b}{a} + r_0\alpha + \frac{r_0b}{a} - r_0\beta = 1v$   
 $r_0(\beta + \alpha) + 2 \cdot \frac{r_0b}{a} = 1v \rightarrow 2 \cdot \frac{r_0b}{a} = -r \rightarrow \frac{b}{a} = -\frac{r}{2}$

$|\alpha - \beta| = \sqrt{\alpha^r \beta^r - r\alpha\beta} = \sqrt{1 - \frac{1}{a}} = \sqrt{\frac{a-1}{a}} = \frac{r}{\sqrt{a}}$

10)  $\frac{1-a}{r} = -r \rightarrow (-r, -\frac{1}{r}) \rightarrow y = a(x+r)^r - \frac{1}{r}$   
 $\frac{r}{r} = a(0+r)^r - \frac{1}{r} \rightarrow a = \frac{1}{r}$   
 $x=0 \rightarrow \frac{1-a}{r} = -r \rightarrow (-r, -\frac{1}{r})$   
 $(1, \beta) \beta = \frac{1}{r} (1+r)^r - \frac{1}{r} \rightarrow \beta = \frac{9-1}{r} = 8$

11)  $x^r + 9x + a = 0 \rightarrow \frac{-9 \pm \sqrt{81-4a}}{r} \rightarrow \alpha < \beta$   
 $\alpha = \frac{-9 - \sqrt{81-4a}}{r} \rightarrow r\alpha^r = 45 - 9a + 12\sqrt{9-a}$   
 $\beta = \frac{-9 + \sqrt{81-4a}}{r} \rightarrow r\beta^r = 45 - 9a - 12\sqrt{9-a}$   
 $r\alpha^r + r\beta^r = 90 - 18a + 12\sqrt{9-a} = 12\sqrt{9-a} + 18a \rightarrow 90 - 18a = 18a \rightarrow a = 1$

12)  $r^4 x^r - (m+1r)x + 1 = 0 \rightarrow \alpha + \beta = \frac{m+1r}{r^4}, \alpha\beta = \frac{1}{r^4}$   
 $\sqrt{\frac{1}{\alpha}} + \sqrt{\frac{1}{\beta}} = \omega \rightarrow \frac{\sqrt{\alpha} + \sqrt{\beta}}{\sqrt{\alpha\beta}} = \omega \rightarrow \frac{\omega}{r} = \sqrt{\alpha} + \sqrt{\beta} \rightarrow \alpha + \beta + r\sqrt{\alpha\beta} = \frac{r\omega}{r^4}$   
 $\frac{m+1r}{r^4} + \frac{r}{r^4} = \frac{r\omega}{r^4} \rightarrow \frac{m+1r+r}{r^4} = \frac{r\omega}{r^4}$   
 $-x^r + rx + r = 0 \rightarrow \frac{c}{a} = -r$   
 $m = -1$