

Subject

Year .

Mont.

Day .

المادة الثانية عشر - (مجموعتين) - (1) - (2)

40

(1)

$$y = ax^2 + bx + c \rightsquigarrow \omega' = (-1, 9)$$

$$\omega'' = (1, 1)$$

$$\frac{-b}{2a} = -1 \rightsquigarrow -b = -2a \rightsquigarrow b = 2a$$

$$\frac{fac - b^2}{4a} = \frac{fac - 4a^2}{4a} = c - a = 9 \rightsquigarrow c = a + 9$$

$$\rightsquigarrow y = ax^2 + 2ax + a + 9$$

$$\omega' = (1, 1) \rightarrow 1 = 9a + 2a + a + 9 \rightsquigarrow 14a = -10 \rightsquigarrow a = -\frac{10}{14}$$

$$\rightsquigarrow b = 2a = 2\left(-\frac{10}{14}\right) = -\frac{10}{7}$$

$$\rightsquigarrow c = a + 9 = -\frac{10}{14} + 9 = -\frac{10}{14} + \frac{126}{14} = \frac{116}{14}$$

$$\rightsquigarrow y = -\frac{10}{14}x^2 - \frac{10}{7}x + \frac{116}{14}$$

(2)

$$2x^2 + mx + m + 4 > 0$$

$$\frac{m+4}{2} > 0 \rightsquigarrow m+4 > 0$$

$$b^2 - 4ac > 0 \rightsquigarrow m^2 - 4 \times 2 \times (m+4) > 0$$

$$\rightsquigarrow m > -4$$

$$m^2 - 8m - 16 > 0 \rightsquigarrow (m - 12)(m + 4) > 0$$

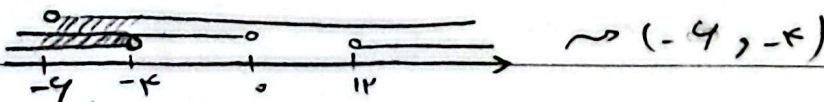
x	-4	12	
y	+	-	+

$$\rightsquigarrow (-\infty, -4) \cup (12, +\infty)$$

$$\frac{-b}{2a} = -\frac{m}{4} > 0 \rightsquigarrow -m > 0 \rightsquigarrow m < 0$$

$$\frac{fac - b^2}{4a} = \frac{2 \times (m+4) - m^2}{4} = m + 4 - \frac{m^2}{4} < 0$$

$$2m + 8 - m^2 < 0 \rightsquigarrow m^2 - 2m - 8 > 0 \rightsquigarrow (-\infty, -4) \cup (12, +\infty)$$



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$$\mu x^r + (r-m)x + r - m = 0 \quad (2)$$

$$\frac{-b}{a} = \frac{1-rm}{\mu}$$

$$\frac{c}{a} = \frac{r-m}{\mu}$$

$$\rightarrow \frac{1-rm}{\mu} = \frac{\mu}{r-m} \rightarrow (1-rm)(r-m) = \mu^2$$

$$r-m - rm + rm^2 = \mu^2$$

$$rm^2 - \mu m - \mu^2 = 0$$

$$m^2 - \mu m - \mu^2 = 0 \rightarrow (m-\mu)(m+\mu) = 0$$

$$\rightarrow m = \frac{\mu}{r} \quad \checkmark \quad \rightarrow \boxed{m = \frac{\mu}{r}}$$

$$\rightarrow m = -\frac{\mu}{r} = -1 \rightarrow \text{Q.E.E}$$

$$b^2 - 4ac = (r-m)^2 - 4\mu(r-m)$$

$$\xrightarrow{m=-1} (-r-1)^2 - 4\mu(r+1) = 9 - 4\mu = -4\mu \rightarrow \Delta < 0$$

$$\xrightarrow{m=\frac{\mu}{r}} (r \times \frac{\mu}{r} - 1)^2 - 4\mu(r - \frac{\mu}{r}) = 4^2 - 4\mu(r - \frac{\mu}{r})$$

$$= 16 - 4\mu r + 4\mu^2 = 4(4 - \mu r + \mu^2) = 4\Delta \rightarrow \Delta > 0$$

(3)

$$x = x^r - r \rightarrow x^r - x - r = 0$$

$$x_1^r = -(-1) = 1 \quad x_1^r + \frac{1}{x_1} + x_1^r + \frac{1}{x_1} = x_1^r + x_1^r + \frac{1}{x_1} + \frac{1}{x_1}$$

$$\frac{1}{x_1} = -r = -r \quad (x_1 + x_1)^r = x_1^r + x_1^r + r x_1 x_1 (x_1 + x_1)$$

$$1^r = x_1^r + x_1^r + r(-r)x_1$$

$$x_1^r + x_1^r = 1 + 1r = 1^r$$

$$\frac{1}{x_1} + \frac{1}{x_1} = \frac{x_1 + x_1}{x_1 x_1} = \frac{1}{-r} = -\frac{1}{r} \quad \rightarrow 1^r - \frac{1}{r} = \frac{r^2 - 1}{r} = \frac{\Delta}{r}$$

$$(x_1^r + \frac{1}{x_1}) (x_1^r + \frac{1}{x_1}) = x_1^r x_1^r + x_1^r + x_1^r + \frac{1}{x_1 x_1}$$

$$= (-r)^r + 9 + \frac{1}{-r} = -4r + 9 - \frac{1}{r} = -\Delta - \frac{1}{r} = -\frac{r^2}{r}$$

$$(x_1 + x_1)^r = x_1^r + x_1^r + r x_1 x_1 \rightarrow 1 = x_1^r + x_1^r - 1 \rightarrow x_1^r + x_1^r = 9$$

K.P.C

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$$y = x^r - sx + p$$

$$s = \frac{\Delta 1}{r}, \quad p = -\frac{r \cdot 1}{r}$$

$$y = x^r - \frac{\Delta 1}{r}x - \frac{r \cdot 1}{r}$$
$$r y = r x^r - \Delta x - r \cdot 1$$

(5)

$$\left(\sqrt[r]{x^r} + \frac{1}{\sqrt[r]{x^r}} + 1 \right) \left(\sqrt[r]{x^r} - 1 \right) = r \sqrt[r]{x^r}$$

$$x \sqrt[r]{x} + 1 + \sqrt[r]{x^r} - \sqrt[r]{x^r} - \frac{1}{\sqrt[r]{x^r}} = x \sqrt[r]{x} - \frac{1}{\sqrt[r]{x^r}} = r \sqrt[r]{x}$$

$$x^r - 1 = r x \rightarrow x^r - r x - 1 = 0$$

$$b^r - 4ac = (-r)^r - 4 \cdot 1 \cdot (-1) = r + r = 2r$$

$$\frac{r \pm r \sqrt{r}}{r} = 1 \pm \sqrt{r} \rightarrow 1 + \sqrt{r} + 1 - \sqrt{r} = \boxed{2}$$

(4)

$$r x^r - a x + r = 0$$

$$\frac{r}{r} = r \alpha^r \rightarrow \alpha^r = \frac{r}{r} \rightarrow \alpha = \pm \frac{r}{r}$$

$$\frac{r}{r} = r \alpha = r \left(\pm \frac{r}{r} \right) = \pm \frac{r}{r} \rightarrow \alpha = \pm 1$$

$$+1 - (-1) = 1 + 1 = \boxed{2}$$

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$$y = ax^2 + (3+2a)x \rightsquigarrow \text{میدان}$$

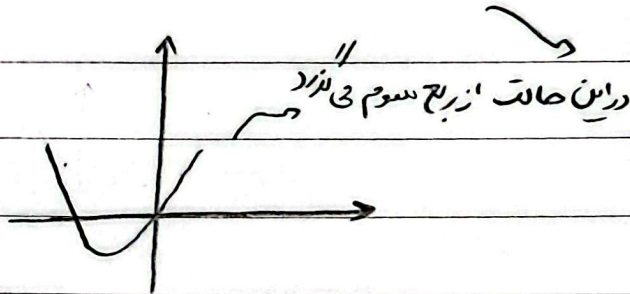
(✓)

$$\rightsquigarrow a > 0$$

$$\rightsquigarrow \frac{-3-2a}{a} < 0 \rightsquigarrow \text{پنج ریشه حتمی است}$$

م. ای هیچ مقدار a

پنج از ریشه ها 0 و یکی از ریشه حتمی باشد



(^)

$$y = x^2 + ax - 2 \rightsquigarrow \frac{-b}{2a} = \frac{-a}{2} = -1 \rightsquigarrow -a = -2$$

$$a = 2$$

$$y = -x^2 - 2x + b$$

$$\rightsquigarrow \frac{-b}{2a} = \frac{2}{-2} = -1$$

$$y = x^2 + 2x - 2 \rightsquigarrow y=1 \quad 1 = x^2 + 2x - 2 \rightsquigarrow x^2 + 2x - 3 = 0$$

$$\rightsquigarrow (x+3)(x-1) = 0 \rightsquigarrow x = -3$$

$$\rightsquigarrow x = 1$$

$$\rightsquigarrow (1, 1) \quad 1 = -1 - 2 + b \rightsquigarrow b = 4$$

$$\rightsquigarrow (-3, 1) \quad 1 = -9 + 4 + b \rightsquigarrow b = 4$$

$$\rightsquigarrow b = 4$$

$$ab = 2 \times 4 = \boxed{8}$$

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$$rx' - ax + b = 0 \rightsquigarrow \frac{a}{r}$$

(9)

$$ra x' + ax - 9 = 0 \rightsquigarrow \frac{-a}{ra} = \frac{-1}{r}$$

$$\frac{a}{r} = -\frac{1}{r} + 1 \rightsquigarrow \frac{a}{r} = \frac{1}{r} \rightsquigarrow a = 1$$

$$rx' + x - 9 = 0$$

$$(x_1 + \frac{1}{r})(x_2 + \frac{1}{r}) =$$

$$\hookrightarrow x_1 = -\frac{1}{r}$$

$$x_1 x_2 + \frac{1}{r} x_1 + \frac{1}{r} x_2 + \frac{1}{r^2}$$

$$-x_2 = \frac{-9}{r} = -9$$

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

$$-x_2 + \frac{1}{r}(-\frac{1}{r}) + \frac{1}{r^2} = x_2 - \frac{1}{r^2} + \frac{1}{r^2} = x_2$$

$$\rightsquigarrow \frac{b}{r} = -9 \rightsquigarrow b = -9$$

$$\left[\frac{ab}{r} \right] = \left[\frac{1 \times (-9)}{r} \right] = [-1, 0] = \boxed{-r}$$

(10)

$$x' + 4x + m = 0 \rightsquigarrow -4 \text{ مقلوب } 4$$

$$x' + rx - 3m = 0 \rightsquigarrow -r \text{ مقلوب } r$$

$$x' + 4x + m = x' + rx - 3m$$

$$rx = -3m \rightsquigarrow x = -\frac{3m}{r}$$

$$-r + m$$

$$-4 + m$$

$$\left. \begin{array}{l} -r + m \\ -4 + m \end{array} \right\} -r + m + 4 - m = \boxed{4}$$

K.P.C