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کوثر عابدینی

۱) $\frac{-b}{2a} = -1 \Rightarrow 2a = b$

$$\begin{cases} 1 = 9a + 6a + c \\ 9 = a - 2a + c \end{cases} \quad -8 = 14a \Rightarrow \cancel{a = -2}$$

$a = -2 \Rightarrow \cancel{b = -4} \Rightarrow c = 31 \Rightarrow \cancel{y = -2x^2 - 4x + 31}$

۲) $2x^2 + mx + (m+6) = 0 \qquad a = 2,\ b = m,\ c = m+6$ دو ریشه مثبت

$1 - \Delta \geq 0 \Rightarrow m^2 - 4(2)(m+6) \geq 0 \Rightarrow m^2 - 8m - 48 \geq 0$

$\Rightarrow (m-12)(m+4) = 0 \Rightarrow m = 12,\ m = -4$ — $-4 \quad 12$: $+ \quad - \quad +$

$\Rightarrow m \in (-\infty, -4] \cup [12, +\infty)$

$2 - P > 0 \Rightarrow P = \frac{c}{a} = \frac{m+6}{2} > 0 \Rightarrow m + 6 > 0 \Rightarrow m > -6$

$3 - S > 0 = \frac{-b}{a} = \frac{-m}{2} > 0 \Rightarrow -m > 0 \Rightarrow m < 0$

$m < -4$, $m > 12$ $\qquad (-6, -4)$

$$\begin{cases} m \leq -4 ,\ m \geq 12 \\ m > -6 \\ m < 0 \end{cases} \cap \Rightarrow -6 < m \leq -4 \Rightarrow m \in (\cancel{-6}, -4]$$

۳) $3x^2 + x(2m-1) + (2-m) = 0 \qquad a = 3,\ b = 2m-1,\ c = 2-m$

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$x_1 + x_2 = \frac{-b}{2a} = \frac{-2m+1}{3} \quad , \quad x_1 x_2 = \frac{c}{a} = \frac{2-m}{3}$

$\Rightarrow x_1 + x_2 = \frac{1}{x_1 x_2} \Rightarrow -\frac{2m-1}{3} = \frac{1}{\frac{2-m}{3}} \Rightarrow -\frac{2m-1}{3} = \frac{3}{2-m}$

$\Rightarrow (-2m+1)(2-m) = 9 \Rightarrow -4m + 2m^2 + 2 - m = 9 \Rightarrow 2m^2 - 5m - 7 = 0$

$\Rightarrow m = \frac{5 \pm \sqrt{81}}{4} \Rightarrow m = \frac{7}{2}$ یا $m = -1$

$\Rightarrow \Delta = (2m-1)^2 - 4 \times 3 \times (2-m) = 4m^2 + 8m - 23$

$m = \frac{7}{2} \Rightarrow + ✓ \qquad \Delta = 4(\frac{49}{4}) + 8(\frac{7}{2}) - 23 = 54$

$m = -1 \Rightarrow ✗ \qquad \Delta = 4 - 8 - 23 = -27 ✗$

$\Rightarrow m = \frac{7}{2}$

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$x^2 - x - 4 = 0 \longrightarrow x_1 + x_2 = 1 \quad , \quad x_1 x_2 = -4$

$y_1 = x_2^3 + \frac{1}{x_1} \quad , \quad y_2 = x_1^3 + \frac{1}{x_2} \longrightarrow y^2 - Sy + P = 0$

$\to S = (x_2^3 + \frac{1}{x_1}) + (x_1^3 + \frac{1}{x_2}) = (x_1^3 + x_2^3) + (\frac{1}{x_1} + \frac{1}{x_2})$

$= (x_1 + x_2)^3 - 3x_1x_2(x_1+x_2) = 1 - 3(-4)(1) = 13$ $\quad \longrightarrow \frac{x_1 + x_2}{x_1 x_2} = -\frac{1}{4}$

$\Rightarrow S = 13 - \frac{1}{4} = \frac{51}{4}$

$\to P = (x_2^3 + \frac{1}{x_1})(x_1^3 + \frac{1}{x_2}) = x_1^3 x_2^3 + x_1^3 \times \frac{1}{x_1} + x_2^3 \times \frac{1}{x_2} + \frac{1}{x_1 x_2}$

$\Rightarrow P = (x_1 x_2)^3 + (x_1^2 + x_2^2) + \frac{1}{x_1 x_2} \Rightarrow (-64) + 9 + \frac{-1}{4} = \frac{-221}{4}$

$\Rightarrow y^2 - \frac{51}{4}y - \frac{221}{4} = 0 \Rightarrow 4y^2 - 51y - 221 = 0$

۵ $\quad x_1 + x_2 = ?$

۵ $\quad \left(\sqrt[3]{x^2} + \frac{1}{\sqrt[3]{x^2}} + 1\right)\left(\sqrt[3]{x^2} - 1\right) - 2\sqrt[3]{x} = 0$

$x\sqrt[3]{x} - \sqrt[3]{x^2} + 1 - \frac{1}{\sqrt[3]{x^2}} + \sqrt[3]{x^2} - 2 = 2\sqrt[3]{x}$

$\left((x - 2 - \frac{1}{x}) = 2\right) \times x \quad \cancel{x^2 - 2x - 1 = 2x} \quad \cancel{\to x^2 - 4x - 1 = 0}$

$\cancel{x_1 + x_2 = \frac{-b}{a} = 4}$

$\left(\sqrt[3]{x^2} + \frac{1}{\sqrt[3]{x^2}} + 1\right)\left(\sqrt[3]{x^2} - 1\right) = 2\sqrt[3]{x}$

$\frac{\left(\sqrt[3]{x^4} + \sqrt[3]{x^2} + 1\right)\left(\sqrt[3]{x^2} - 1\right)}{\sqrt[3]{x^2}} = 2\sqrt[3]{x}$

$x^2 - 1 = 2x \longrightarrow x^2 - 2x - 1 = 0$

$x_1 + x_2 = \frac{-b}{a} = 2$

Senobar

۴ $x_1 = r$, $x_2 = 3r$

$x_1 x_2 = \frac{4}{3} \Rightarrow 3r^2 = \frac{4}{3} \Rightarrow r^2 = \frac{4}{9} \Rightarrow r = \pm\frac{2}{3}$

$x_1 + x_2 = 4r = \frac{-b}{a} \xrightarrow{b=-a} \frac{a}{3} \Rightarrow 4r = \frac{a}{3} \Rightarrow a = 12r$

$r = \frac{2}{3} \longrightarrow a = 8$, $r = -\frac{2}{3} \longrightarrow a = -8$, $|8-(-8)| = 16$

۷ $y = ax^2 + (4+3a)x \xrightarrow{x=0 \Rightarrow y=0}$ نمودار از مبدا می‌گذرد

$x_r < 0$. $y \geq 0$ $\overset{4+3a>0,\ 3a>-4}{a > -\frac{4}{3}}$ $a < -\frac{4}{3}$ $(3a+4)^2 > 0$ $a \neq -\frac{4}{3}$ $\Delta = 0$

$-\frac{3}{2} < a < 0$ [بازای هیچ مقدار a

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۸ $-x^2 - 2x + b$, $x^2 + 2x - 2$

$x=1$: $-1 - 2 + b = 1$ $\quad \frac{-2}{2} = -1 \Rightarrow 1 - 2 - 2 = -3$

$\boxed{b = 4}$ $\quad x^2 + 2x - 2 = 1 \Rightarrow x^2 + 2x - 3 = 0$

$-3, 1$ $\quad \Rightarrow (x+3)(x-1) = 0 \quad \boxed{-3, 1}$

$\boxed{a+b = 8}$

۹ $2at^2 + at - 6 = 0 \to 2(t + \frac{1}{2})^2 - a(t + \frac{1}{2}) + b = 0$

۲ $\to 2t^2 + (2-a)t + \frac{1-a}{2} + b \equiv 2at^2 + at - 6 = 0$

$\to 2a = 2$, $a = 1$

$\frac{1-1}{2} + b = -6 \Rightarrow b = -6$

$[\frac{ab}{4}] = [\frac{-6}{4}] = [\frac{-3}{2}] = \boxed{-2}$

کنکور عادی

۱۰ ۲ $۴x = -۴m \rightarrow x = -m$

$m^۲ - ۶m + m = ۰ \rightarrow m^۲ = ۵m \rightarrow m = ۵ \rightarrow x^۲ + ۲x - ۱۵ = ۰$

$\rightarrow (x+۵)(x-۳) = ۰$ $-۵ , ۳$ $x^۲ + ۶x + ۵ = ۰ \rightarrow (x+۵)(x+۱) = ۰$

-۵ و -۱

$|۳ - (-۱)| = \boxed{۴}$