۱۸,۵

نام و نام خانوادگی سید محمدحسین اجاقی پاسخنامه تشریحی تکلیف شماره ۳ کلاس دهم ریاضی A

۱ (۲)

$y = ax^2 + bx + c \qquad \dfrac{-b}{2a} = -1 \qquad b = 2a$

$y = ax^2 + 2ax + c \xRightarrow[x=-1]{y=9} a - 2a + c = 9 \qquad -a + c = 9$

$y = ax^2 + 2ax + c \xRightarrow[x=3]{y=1} 9a + 6a + c = 1 \qquad 15a + c = 1$

$16a = -8 \Rightarrow a = -\dfrac{1}{2} \qquad c = \dfrac{17}{2}$

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

۲ (۲)

$2x^2 + mx + m + 6 = 0$

$\Delta > 0 \quad \Delta = 0 \quad \Delta < 0$

+	+
+	−
−	+
−	−

۲ ریشه مثبت

$\Delta > 0 \quad m^2 - 8m - 48 > 0 \quad (m+4)(m-12)$

$S > 0 \quad \dfrac{-b}{a} > 0 \Rightarrow \dfrac{-m}{2} > 0 \Rightarrow m < 0$

$P > 0 \Rightarrow \dfrac{m+6}{2} > 0 \Rightarrow m > -6 \qquad \dfrac{c}{a} > 0$

$-4 \quad 12$; $+ \; 0 \; - \; 0 \; +$; $(12, +\infty) \cup (-\infty, -4)$

$(-\infty, 0) \cap (-6, +\infty) \cap ((12, +\infty) \cup (-\infty, -4)) = (-6, -4)$ جواب

۳ (۲)

$3x^2 + (2m-1)x + 2 - m \qquad S = \dfrac{-b}{a} = \dfrac{-2m+1}{3} \qquad P = \dfrac{c}{a} = \dfrac{2-m}{3}$

$\dfrac{-2m+1}{3} = \dfrac{3}{2-m} \qquad 2m^2 - 5m + 2 = 9$

$2m^2 - 5m - 7 = 0$ روش $\Rightarrow m^2 - 5m - 14 = 0 \Rightarrow (m-7)(m+2)$

$m = -1 \Rightarrow 3x^2 - 3x + 3 = 0 \quad \Delta < 0$ غ ق ق

$m = \dfrac{7}{2} \Rightarrow 3x^2 + 6x - \dfrac{3}{2} \quad \Delta > 0$ ق ق

$m = \dfrac{7}{2}$

۴ (۲)

$x^2 - x - 4 = 0 \qquad S = 1 \quad P = -4$

فرض می‌کنیم

$\left(x - \left(x_2^3 + \dfrac{1}{x_1}\right)\right)\left(x - \left(x_1^3 + \dfrac{1}{x_2}\right)\right) = x^2 - \left(\underbrace{x_1^3 + x_2^3}_{S^3 - 3SP} + \underbrace{\dfrac{1}{x_1} + \dfrac{1}{x_2}}_{\frac{S}{P}}\right)x + \left(\underbrace{x_1^3 x_2^3}_{P^3} + \underbrace{x_2^2 + x_1^2}_{S^2 - 2P} + \underbrace{\dfrac{1}{x_1 x_2}}_{\frac{1}{P}}\right)$

$\boxed{\Rightarrow x^2 - \dfrac{51}{4}x - \dfrac{221}{4} = 0}$

۵ (۲)

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

$\sqrt[3]{x^2} = t \Rightarrow x = t^{\frac{3}{2}}$

$\left(t + \dfrac{1}{t} + 1\right)(t - 1) = t^2 + 1 + t - t - \dfrac{1}{t} - 1 = 2\sqrt{t}$

$t^2 - \dfrac{1}{t} = 2\sqrt{t} \qquad \dfrac{t^3 - 1}{t} = 2t^{\frac{1}{2}}$

$t^3 - 1 = 2t^{\frac{3}{2}} \xLeftarrow{x = t^{\frac{3}{2}}} x^2 - 2x - 1 = 0 \Rightarrow x = \dfrac{2 \pm \sqrt{8}}{2} = 1 \pm \sqrt{2}$

$x_1 + x_2 = 1 + \sqrt{2} + 1 - \sqrt{2} = 2$

$3(x-x_1)(x-3x_1) = 3x^2 - ax + 4 = 0$ $\quad S = \frac{-b}{a}$ $\quad P = \frac{c}{a}$ $\quad$ ۰/۵ $\quad$ ۶

$\frac{+a}{3} = +4x_1$ ✓

$a = 12x_1$

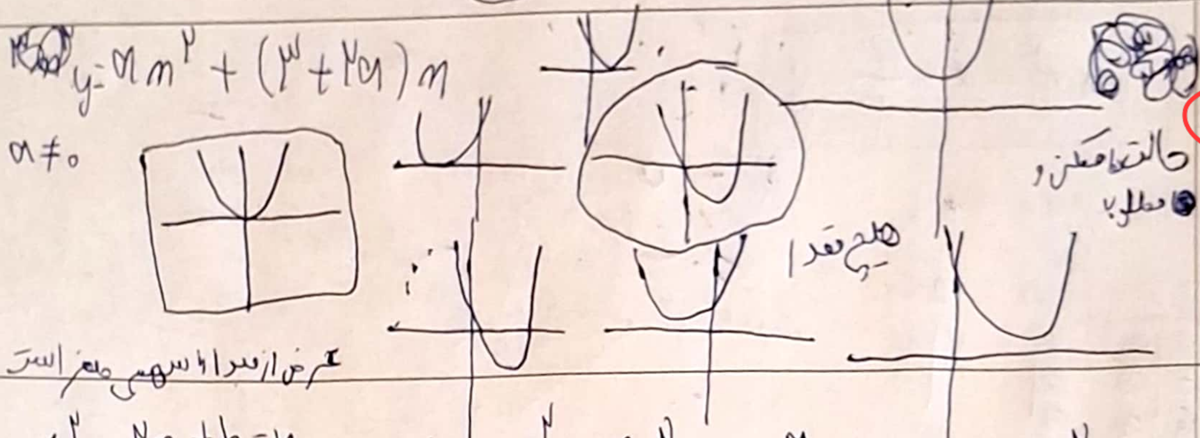
$3x_1^2 = 4 \Rightarrow x_1 = \pm\sqrt{\frac{4}{3}} = \pm\frac{2\sqrt{3}}{3}$

$a = 12 \times \frac{2\sqrt{3}}{3} = 8\sqrt{3}$ یا $12 \times -\frac{2\sqrt{3}}{3} = -8\sqrt{3}$

$8\sqrt{3} \div (-8\sqrt{3}) = 16\sqrt{3}$

$y = ax^2 + (3+2a)x$ $\quad$ ۲ $\quad$ ۷

$a \neq 0$



عرض از مبدا همیشه صفر است

$-x^2 - 2x + b = y$ $\quad y = x^2 + ax - 2$ $\quad \frac{-a}{2} = -1$ $\quad a = 2$ $\quad$ ۲ $\quad$ ۸

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

$\boxed{ab = 2 \times 4 = 8}$ ✓

$x=-3$: $-x^2 - 2x + b = x^2 + 2x - 2 = 1 \Rightarrow x^2 + 2x - 3 = 0$

$-9 + 6 + b = 1 \quad b = 4$ $\quad \Rightarrow (x+3)(x-1) = 0 \begin{cases} x = 1 \\ x = -3 \end{cases}$

$x=1$: $-1 - 2 + b = 1 \quad b = 4$

$2x^2 - x + b = 0 = 2(x-2)(x+\frac{3}{2})$ $\quad$ ۲

$2x^2 - ax + b = 0 \Rightarrow S = \frac{+a}{2}$ $\quad$ داریم $\quad = 2x^2 - x - 6$

$2ax^2 + ax - 6 = 0 \Rightarrow S' = \underbrace{\frac{-a}{2a}}_{-0/5} = \frac{a}{2} - 1$ $\quad \frac{a}{2} - \frac{1}{2} = 0$ $\quad$ ۹

$2x^2 + x - 6 = 0$ $\quad \Rightarrow \begin{cases} x = \frac{3}{2} \\ x = -2 \end{cases} \Rightarrow \begin{cases} x = 2 \\ x = -\frac{3}{2} \end{cases}$ $\quad a = 1$ $\quad b = -6$ $\quad a = 1$

درس $\Rightarrow x^2 + x - 12 = 0$ $\quad \underbrace{(x+4)}_{-4}\underbrace{(x-3)}_{3} = 0$

ریشه‌های معادله اول

$\left[\frac{ab}{4}\right] = \left[\frac{-6}{4}\right] = -2$ ✓

$x^2 + 2x - 3m = 0$ $\quad x^2 + 6x + m = 0$ $\quad \Rightarrow \alpha^2 + 2\alpha - 3m = \alpha^2 + 6\alpha + m$ $\quad$ ۲ $\quad$ ۱۰

$\Rightarrow \alpha^2 + \underbrace{2\alpha + 3\alpha}_{5\alpha} = 0$ $\quad \Rightarrow \alpha(\alpha+5) = 0$ $\quad \alpha^2 + 6\alpha - \alpha = 0$ $\quad -4\alpha = 4m$

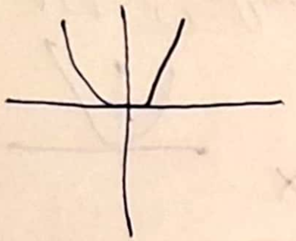
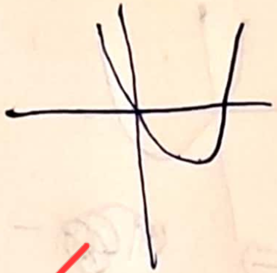
$\Rightarrow \alpha = 0$ ✗ غ ق ق $\quad \alpha = 0$ ✗ ق $\quad \alpha = -m$

$\alpha = 5$ ✓ $\quad$ ✓ $\alpha = -5$ $\quad \Rightarrow m = 5$

$x^2 + 2x - 15 = 0$ $\quad x^2 + 6x + 5 = 0$ $\quad 3 - (-1) = 4$ ✓

$(x+5)(x-3) = 0 \begin{cases} x = -5 \\ x = 3 \end{cases}$ $\quad (x+5)(x+1) = 0 \begin{cases} x = -1 \\ x = -5 \end{cases}$

ادامه حل سوال ۷

$a > 0 \qquad a > 0 \Rightarrow a \in (-\infty, -\frac{3}{4}]$

$P = 0$ همواره ✓ $\Rightarrow 3 + 4a \leq 0$

$S \geq 0 \qquad \frac{-b}{a} \geq 0 \Rightarrow b \leq 0$ چون $a>0$

$\Delta \geq 0$ همواره درست $(3+4a)^2 \geq 0$ ✓

$(0, +\infty) \cap (-\infty, -\frac{3}{4}] = \varnothing$

به ازای هیچ مقدار a

۶-

$$P = \alpha \underbrace{\cancel{\beta}}_{۳\alpha} = ۳\alpha^{۲} = \frac{۴}{۳} \rightarrow \alpha = \mp \frac{۲}{۳}$$

$$S = \alpha + \underbrace{\cancel{\beta}}_{۳\alpha} = ۴\alpha = \frac{a}{۳} \rightarrow \mp \frac{۸}{۳} = \frac{a}{۳} \rightarrow \boxed{a = \mp ۸}$$

اختلاف $= \boxed{۱۶}$