۱۷٫۵

یازدهم ریاضی B — تکلیف شماره ۱۹ — مهرشاد جابرزاده

۱- (۲)

$\alpha = 2\beta \Rightarrow \alpha \times \beta = 2\beta \times \beta = 2\beta^2 = \frac{4}{3} \Rightarrow 9\beta^2 = 4 \Rightarrow \beta = \pm\frac{2}{3}$

if $\beta = \frac{2}{3} \Rightarrow \beta + 2\beta = \frac{8}{3} \Rightarrow a = 8$

$8 - (-8) = 16$ ✓

if $\beta = -\frac{2}{3} \Rightarrow \beta + 2\beta = -\frac{2}{3} - \frac{4}{3} \Rightarrow a = -8$

۲- (۲)

$x = \alpha, \beta \rightarrow \sqrt{\frac{1}{\alpha}} + \sqrt{\frac{1}{\beta}} = 5 \Rightarrow 25 = \frac{1}{\alpha} + 2\sqrt{\frac{1}{\alpha\beta}} + \frac{1}{\beta}$

$\frac{1}{36} = \alpha$

$25 = \frac{1}{\alpha} + \frac{1}{\beta} + 2 \times 6$

$13 = \frac{1}{\alpha} + \frac{1}{\beta} \Rightarrow \frac{\alpha+\beta}{\alpha\beta} = 13 \Rightarrow \frac{\alpha+\beta}{\frac{1}{36}} = 13 \Rightarrow \frac{13}{36} \Rightarrow \alpha + \beta \Rightarrow$

$m + 14 = 13$

$m = -1$

$-x^2 + 2x + 2 \Rightarrow \alpha \times \beta = \frac{2}{-1} = -2$ ✓

۳- (۲)

$4x^3 + kx^2 - 9x - 2 = 0 \Rightarrow m(x-\alpha)^2 \times (x-\beta) \rightarrow (x^2 - 2\alpha x + \alpha^2) \times (x-\beta) \Rightarrow$

$4(x^3 + \alpha^2 x - 2\alpha x^2 - \beta x^2 - \beta\alpha^2 - 2\alpha\beta x) \Rightarrow -\beta\alpha^2 = -\frac{2}{4} \Rightarrow \beta\alpha^2 = \frac{1}{2}$

$\frac{\beta\alpha^2}{\alpha\beta} = \alpha = \frac{\frac{1}{2}}{-2} \Rightarrow \alpha = -\frac{1}{4} \Rightarrow k = -(2\alpha+\beta) \times 4 = -\frac{c}{4} \times 4 = -4$ ✓

۴- (۰٫۵)

$\alpha + \beta = -6, \quad \alpha\beta = a$ ✓ — حواست به α و a باشه!

$\beta = 6 - \alpha \rightarrow \beta^3 = 2(36 + 12\alpha + \alpha^2) + 3\alpha^2 = 5\alpha^2 + \sqrt{2} + 24\alpha = 12\sqrt{2} + 18$

$5\alpha^2 + 24\alpha = 12\sqrt{2} + 13 \Rightarrow \alpha = \frac{-24 \pm \sqrt{\ldots 240\sqrt{12}}}{10} \Rightarrow \alpha_1 = \frac{-9+12\sqrt{5}}{5}$

$5\alpha^2 + 24\alpha - 12\sqrt{2} + 13 = 0 \Rightarrow \nearrow \quad -4 - \sqrt{2} = \alpha_2$

محاسبات غلط

ما a رو می‌خوایم نه α!

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۵-

$x^2 = t \Rightarrow t^2 - 7t - 5 = 0$

$\frac{7 \pm \sqrt{69}}{2} = t_1, t_2 \to \frac{7 - \sqrt{69}}{2}$ غ ق ق $\Rightarrow t = \frac{7 + \sqrt{69}}{2} = x^2$

$x_1 = \sqrt{\frac{7+\sqrt{69}}{2}}, \quad x_2 = -\sqrt{\frac{7+\sqrt{69}}{2}} \Rightarrow P = -\left(\frac{7+\sqrt{69}}{2}\right), \quad S = 0$

$\sqrt{\frac{7+\sqrt{69}}{2}} - \sqrt{\frac{7+\sqrt{69}}{2}} = 0 \Rightarrow 2P^2 - 4SP + 13S = 59 + 7\sqrt{69} = 2P^2$ ✓

(۲)

۶-

$2x^2 - ax + b = 0 \Rightarrow x_1 + x_2 = \frac{a}{2}$ $\quad x_1 + x_2 = x_1' + x_2' + 1$

$2ax^2 + ax - 4 = 0 \Rightarrow x_1' + x_2' = -\frac{1}{2}$ $\quad \frac{a}{2} = \frac{1}{2} \Rightarrow a = 1$

(۲)

$2x^2 + x - 4 = 0 \Rightarrow \frac{-1 \pm 7}{4} = -2, \frac{3}{2} \Rightarrow$ ریشه‌های معادله اول $= -1.5, 2$

$-1.5 \times 2 = -3 = \frac{b}{2} \Rightarrow b = -6$

$\left[\frac{1 \times -6}{4}\right] = \left[-\frac{3}{2}\right] = -2$ ✓

۷-

$\alpha + \beta = S = \frac{a}{a} = 1 \Rightarrow \alpha = 1 - \beta \to 20(\alpha^2 = 1 + \beta^2 - 2\beta) =$

$20 + 20\beta^2 - 40\beta \to 40\beta^2 + 20 + 20\beta^2 - 40\beta - 20\beta = 17$

$60\beta^2 - 60\beta + 3 = 0 \to 20\beta^2 - 20\beta + 1 = 0$ ✓ (۱)

$\frac{20 \pm 4\sqrt{10}}{40} =$

ما به دنبال 2β هستیم $\quad t = 2\beta \to 10t^2 - 10t + 1 = 0$ $\quad 1 - \beta - \beta =$ اختلاف دو ریشه

$t = \frac{10 \pm \sqrt{40}}{20}$

$10 \pm 2\sqrt{10}$ $\quad \to \frac{1 \pm 2\sqrt{10}}{10}$

۸-

$(2x+1)(2x+3) = 4x^2+8x+3 = a$

$4x+2 = a+1$

(۲)

$4x+4 = 4x^2+8x+4$ ~~$+ 1$~~

$2x(2x+1) = 0 \leftarrow 0 = 4x^2+2x$

$x_1 = 15x_2 = 3 \rightarrow x = 0$

$x = -\frac{1}{2}$ غق

$x_1 x_2 = 3 \rightarrow a = 3$ ✓

$(2m)(2m+2) = b$

$4m+2 = 10 \Rightarrow m = 2 \rightarrow x_2 = 4 \,,\; x_2 = 6$ ✓

$4 \times 6 = 24 = b$

$|b-a| = |24-3| = 21$ ✓

۹-

(۲)

$\alpha+\beta = -1 \,,\; \alpha\beta = -1-m^2$

$\alpha^2+\beta^2 = (\alpha+\beta)^2 - 2\alpha\beta = 1-2(-1-m^2) = 1+2+2m^2$

به کمترین مقدار → $m = 0$ → (۳) ✓

۱۰-

(۲)

$ax^2+bx+c = 0$

$25a+5b+c = 9a+3b+c$

$16a-8b = 0$

$2a-b = 0$

$2a = b$

$b^2 = 4a^2$

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

$4a^2-4ac = -4a$

$a-c = -1$

$c = a+1$

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$a\beta^2 + 2a\beta + a + 1 = 0$

$a\alpha^2 + 2a\alpha + a + 1 = 0$

$\beta + \alpha = -\frac{b}{a} = \frac{-2a-2}{a} \quad \alpha\beta = \frac{1+a}{a} \Rightarrow \alpha^2\beta^2 + (\beta+\alpha)^2 - 2\alpha\beta$

$-2\left(\frac{a+1}{a}\right) = 1 \Rightarrow \frac{a+1}{a} = -\frac{1}{2}$

$2a + 2 = -a \Rightarrow 2a = -3a \Rightarrow c = \frac{1}{3}$

$S = -4 \quad P = a$

$\alpha, \beta = \frac{-4 \mp \sqrt{16-4a}}{2} \xrightarrow{\alpha<\beta} \alpha = -2 - \sqrt{4-a}$

$\alpha^2 + 2(\alpha^2+\beta^2) = \alpha^2 + 2(S^2 - 2P)$

$(-2-\sqrt{4-a})^2 + 2(16-2a) = 12\sqrt{2} + 18 \rightarrow a = 1$

$S = \alpha + \beta = 1 \rightarrow \alpha = 1 - \beta$

۱۷

$۴۰\beta^۲ + ۲۰(1-\beta)^۲ - ۲۰\beta = 17 \rightarrow ۲۰\beta^۲ - ۲۰\beta + 1 = 0$

$۲۰\beta(\beta - 1) = -1 \rightarrow -۲۰\alpha\beta = -1 \rightarrow \alpha\beta = \frac{1}{۲۰} = \frac{-b}{a} \rightarrow a = -۲۰b$

$-۲۰m^۲ + ۲۰m - ۵ = 0 \rightarrow |\alpha - \beta| = \frac{\sqrt{\Delta}}{|a|} = \boxed{\frac{۲}{\sqrt{۵}}}$