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$x[x + 2(2\sqrt{5}+1)] = -4\sqrt{5}(\sqrt{5}+1)$

$(x + 4\sqrt{5} + 2)$

$x^2 + 4\sqrt{5}x + 2x = -20 - 4\sqrt{5}$

$x^2 + 2x(2\sqrt{5}+1) + 20 + 4\sqrt{5} = 0$

$ax^2 + bx + c = 0$

$\frac{\Delta}{4} = \left(\frac{b}{2}\right)^2 - ac$

$= (2\sqrt{5}+1)^2 - (20 + 4\sqrt{5})$

$= 20 + 1 + 4\sqrt{5} - 20 - 4\sqrt{5}$

$\rightsquigarrow \sqrt{\frac{\Delta}{4}} = 1$

$X_1/X_2 = \frac{-(2\sqrt{5}+1) \mp 1}{1}$ $\quad +: -2\sqrt{5}$ $\quad -: -2\sqrt{5} - 2$

247: $(t-2)^3 + \left(t - \frac{1}{2}\right)^2 = 10t + (t - \sqrt{3})t^2$

$t^3 - 8 - 6t^2 + 12t + t^2 + \frac{1}{4} - t = 10t + t^3 - \sqrt{3}t^2$

$-5t^2 + \sqrt{3}t^2 + t + \frac{-32+1}{4} = 0$

$t^2(\sqrt{3} - 5) + t - \frac{31}{4} = 0$

$4(\sqrt{3}-5)t^2 + 4t - 31 = 0$

$\frac{\Delta}{4} = \left(\frac{b}{2}\right)^2 - ac = 4 - (-31)(4\sqrt{3} - 20) = 4 + 124\sqrt{3} - 620$

$= 124\sqrt{3} - 616 < 124 \cdot 2 - 616 < 0$

↑ poiché $\sqrt{3} < 2$

$\rightsquigarrow$ Impossibile

249: $(x + \sqrt{2} - 1)^2 = x + 1$

$x^2 + 2 + 1 + 2\sqrt{2}x - 2x - 2\sqrt{2} = x + 1$

$x^2 + x(2\sqrt{2} - 3) + 2 - 2\sqrt{2} = 0$

$\Delta = b^2 - 4ac = (2\sqrt{2} - 3)^2 - 4 \cdot 1 \cdot (2 - 2\sqrt{2})$

$= 8 + 9 - 12\sqrt{2} - 8 + 8\sqrt{2} = 9 - 4\sqrt{2}$

Teoria / Strategie: $9-4\sqrt{2}$ è il quadrato di qualcosa?
Dovrei essere (forse) il quadrato di una cosa del tipo

$$\alpha + \beta\sqrt{2} \qquad \alpha, \beta \in \mathbb{R}$$

cioè dovrà valere che

$$\alpha^2 + 2\beta^2 + 2\sqrt{2}\,\alpha\beta = (\alpha + \beta\sqrt{2})^2 = 9 - 4\sqrt{2}$$

$$\begin{cases} \alpha^2 + 2\beta^2 = 9 \\ 2\sqrt{2}\,\alpha\beta = -4\sqrt{2} \end{cases} \qquad \begin{cases} \alpha^2 + 2\beta^2 = 9 \\ \alpha\beta = -2 \end{cases} \Rightarrow$$

Li provate un po' ad occhio

$\alpha = 1$, $\beta = -2$ o viceversa

$\Rightarrow \alpha = 1, \quad \beta = -2$

Ho trovato che $\Delta = 9 - 4\sqrt{2} = (1 - 2\sqrt{2})^2$ $\quad \sqrt{\Delta} = 2\sqrt{2} - 1$

$$x_1 / x_2 = \frac{2\sqrt{2} - 3 \mp (2\sqrt{2} - 1)}{2} = \begin{cases} + \quad \frac{4\sqrt{2} - 4}{2} = 2\sqrt{2} - 2 = 2(\sqrt{2} - 1) \\ - \quad -1 \end{cases}$$

257: $(x+7)^2 + 2(3x-4)(x+7) + (3x-4)^2 = 0$

$$[(x+7) + (3x-4)]^2 = 0$$

$$[4x + 3]^2 = 0 \quad \Rightarrow \quad x = -\frac{3}{4}$$