

Soluție

$$1. \frac{10}{a} + 10a = 10 \frac{1+a^2}{a}, a = \frac{7}{11} \Rightarrow 10 \frac{1+a^2}{a} = \frac{1700}{77} \Rightarrow \left[\frac{10}{a} + 10a \right] = 22 .$$

$$2. x^2 + 4x + 5 = (x+2)^2 + 1 \geq 1 \forall x \in \mathbb{R}, x^2 + 2x + 2 = (x+1)^2 + 1 \geq 1 \forall x \in \mathbb{R} \\ (x^2 + 4x + 5)(x^2 + 2x + 2) \geq 1 \forall x \in \mathbb{R} .$$

$$3. x > 0, \log_2(4x) = \log_2 4 + \log_2 x = 2 + \log_2 x, \log_2 x = t, t^2 + t - 2 = 0 \Rightarrow t \in \{1; -2\} \\ x \in \left\{ 2; \frac{1}{4} \right\} .$$

$$4. T_{k+1} = C_{200}^k \left(\sqrt[3]{x} \right)^{200-k} \left(\frac{2}{\sqrt{x}} \right)^k, k \in \{0; 1; 2; \dots; 200\}, \frac{200-k}{3} - \frac{k}{2} = 0 \Rightarrow k = 80 \Rightarrow T_{81} .$$

$$5. m = -\frac{4}{-8} = \frac{1}{2} \Rightarrow y - 1 = \frac{1}{2}(x - 2) \Rightarrow x - 2y = 0 .$$

$$6. m_a^2 = \frac{2(b^2 + c^2) - a^2}{4}, a^2 = b^2 + c^2 - 2bc \cos A \Rightarrow a^2 = 12, m_a = \sqrt{7} .$$