



Etapa Locală – 26 febr. 2017
clasa a VI-a

Barem de notare

Problema 1.

$$a) \frac{1}{x} + \frac{9}{x} + \frac{90}{x} = \frac{100}{x} \quad 1p$$

$$\frac{100}{x} \in \mathbb{N} \Rightarrow x \in \{1, 2, 4, 5\} \quad 1p$$

$$b) b = 1 + \frac{1}{2} + \frac{2}{3} + \frac{3}{4} + \dots + \frac{2015}{2016} \quad 1p$$

$$m_a = (a + b) : 2 = (1 + 1 + 1 \dots + 1) : 2 = 2016 : 2 = 1008 \quad 1p$$

$$c) 2653 = xa + 13 \mid -13, 13 < x \quad 1p$$

$$351 = xb + 15 \mid -15, 15 < x$$

$$2640 = xa \quad |$$

$$336 = xb \quad | \Rightarrow x \in D(2640, 336) \quad 1p$$

$$\text{Cmmdc}(2640, 336) = 48, x > 15; x \in \{16, 24, 48\} \quad 1p$$

Problema 2.

$$\frac{n}{2} = k^2 \Rightarrow n = 2k^2 \Rightarrow 2 \mid n \quad 1p$$

$$\frac{n}{7} = l^3 \Rightarrow n = 7l^3 \Rightarrow 7 \mid n \quad 1p$$

$$n\text{-minim} \rightarrow n = 2^a 7^b, a, b \in \mathbb{N}^* \quad 2p$$

$$\text{Deci: } \frac{n}{2} = 2^{a-1} 7^b = k^2 \Rightarrow a - 1 = \text{par}, b = \text{par} \quad 1p$$

$$\frac{n}{7} = 2^a 7^{b-1} = l^3 \Rightarrow 3 \mid a, 3 \mid (b - 1) \quad 1p$$

$$\text{Cele mai mici valori } a = 3, b = 4 \Rightarrow n = 2^3 7^4 \quad 1p$$

Problema 3.

$$m(\sphericalangle BOC) = x.$$

$$\text{Cazul I : Figura} \quad 1p$$

$$3x + x = 120 \Rightarrow x = 30^\circ \quad 1p$$

$$m(\sphericalangle AOD) = 90^\circ \quad 1p$$

$$\text{Cazul II : Figura} \quad 1p$$

$$3x - x = 120^\circ \Rightarrow x = 60^\circ \quad 2p$$

$$[OD = [OA \Rightarrow m(\sphericalangle AOD) = 0^\circ$$

1p

Problema 4.

$$\text{a) } A_0A_{2017} = A_0A_1 + A_1A_2 + \dots + A_{2016}A_{2017} = 4(1 + 2 + 3 + \dots + 2016) + 3 \cdot 2017 = 8138595 \text{ cm.} \quad 3p$$

$$\text{b) } A_0A_{10} = 210 \text{ cm.}$$

$$A_0M = MA_{10} = 105 \text{ cm.}$$

2

$$M \in [A_i, A_{i+1}] \Rightarrow A_0A_i \leq A_0M \leq A_0A_{i+1}$$

$$A_0A_i = 4(1 + 2 + \dots + (i-1)) + 3i = i(2i + 1)$$

$$A_0A_{i+1} = 4(1 + 2 + \dots + i) + 3(i + 1) = (i + 1)(2i + 3)$$

$$\Leftrightarrow i(2i + 1) \leq 105 \leq (i + 1)(2i + 3)$$

$$\text{Pentru } i = 7 \Rightarrow A_0A_7 = A_0M \Rightarrow M = A_7$$

2p