



CONCURSUL DE MATEMATICĂ APLICATĂ „ADOLF HAIMOVICI”

Etapa locală – Constanța, 15.02.2015

Clasa a X-a

filiera teoretică: profil umanist, toate specializările

Barem de corectare și notare

SUBIECTUL 1

$$\text{a) } \log_{\frac{1}{2}} \frac{2^{\frac{2}{3}} \cdot 2^{-4} \cdot 2^{-1} \cdot 2^{\frac{1}{3}}}{2^{\frac{7}{2}}} \dots\dots\dots 1\text{p}$$

$$\log_{\frac{1}{2}} 2^{\frac{15}{2}} \dots\dots\dots 1\text{p}$$

Finalizare 1p

$$\text{b) } \log_2 4\sqrt{3} - \log_2 \sqrt{3} + \log_5 75 - \log_5 15 - \lg 100 \dots\dots\dots 2\text{p}$$

$$\log_2 4 + \log_5 5 - 2 = 2 + 1 - 2 = 1 \dots\dots\dots 2\text{p}$$

SUBIECTUL 2

$$\text{a) } N = \frac{1-\sqrt{2}}{-1} + \frac{\sqrt{2}-\sqrt{3}}{-1} + \dots + \frac{\sqrt{2014}-\sqrt{2015}}{-1} \dots\dots\dots 1\text{p}$$

$$N = \sqrt{2015} - 1 \dots\dots\dots 1\text{p}$$

$$(\sqrt{2015} + 1) \cdot N = (\sqrt{2015} + 1) \cdot (\sqrt{2015} - 1) = 2014 \in N \dots\dots\dots 1\text{p}$$

$$\text{b) } \frac{2014}{N} = \frac{2014}{\sqrt{2015} - 1} = \sqrt{2015} + 1 \dots\dots\dots 1\text{p}$$

$$44 < \sqrt{2015} < 45 \mid +1 \dots\dots\dots 2\text{p}$$

$$45 < \sqrt{2015} + 1 < 46 \text{ și finalizare } \dots\dots\dots 1\text{p}$$

SUBIECTUL 3

$$E(x, y) = \sqrt{x^4 + 16(4 - x^2)} + \sqrt{y^4 + 16(4 - y^2)} \dots\dots\dots 1\text{p}$$

$$E(x, y) = |x^2 - 8| + |y^2 - 8| \dots\dots\dots 1\text{p}$$

$$E(x, y) = |x^2 - 8| + |-4 - x^2| \dots\dots\dots 1\text{p}$$

$$E(x, y) = |x^2 - 8| + x^2 + 4 \dots\dots\dots 1\text{p}$$

$$x^2 \leq 4 \text{ și } y^2 \leq 4 \dots\dots\dots 1\text{p}$$

$$x^2 - 8 \leq -4 \Rightarrow |x^2 - 8| = -x^2 + 8 \dots\dots\dots 1\text{p}$$

$$E(x, y) = -x^2 + 8 + x^2 + 4 = 12 = \text{constantă} \dots\dots\dots 1\text{p}$$

SUBIECTUL 4

$$\frac{1}{\log_a x} + \frac{1}{\log_a y} = \frac{4}{\log_a xy} \dots\dots\dots 1\text{p}$$

$$\frac{\log_a x + \log_a y}{\log_a x \cdot \log_a y} = \frac{4}{\log_a xy} \dots\dots\dots 1\text{p}$$

$$(\log_a x + \log_a y)^2 = 4 \log_a x \cdot \log_a y \dots\dots\dots 1\text{p}$$

$$(\log_a x - \log_a y)^2 = 0 \dots\dots\dots 2\text{p}$$

$$\log_a \frac{x}{y} = 0 \Rightarrow \frac{x}{y} = 1 \dots\dots\dots 2\text{p}$$