

CONCURSUL NAȚIONAL DE MATEMATICĂ APLICATĂ
“ADOLF HAIMOVICI”
ETAPA LOCALĂ
Suceava, 19 februarie 2017

CLASA a X-a: profil umanist, specializarea filologie, științe sociale

BAREM DE CORECTARE

- 1. a)** $\left(\sqrt[3]{5}\right)^3 - \left(\sqrt[3]{4}\right)^3 = 1$ **3p**
b) $6^{\log_6 5} + \frac{10^2}{25} - 36 = -27$ **4p**
- 2. a)** $E = (n^2 - 1)(n^2 - 4) + 2 = n^4 - 5n^2 + 6$ **1p**
 $(n^2 - 3)^2 < n^4 - 5n^2 + 6 < (n^2 - 2)^2, \forall n \in \mathbb{N}, n \geq 3 \Rightarrow \sqrt{E} \in \mathbb{R} \setminus \mathbb{Q}$ **1p**
 $\left[\sqrt{E}\right] = n^2 - 3$ **1p**
- b)** $n^3 < n(n+1)(n+2) < (n+1)^3 \Rightarrow \sqrt[3]{n(n+1)(n+2)} \in \mathbb{R} \setminus \mathbb{Q}$ **2p**
 $\left[\sqrt[3]{n(n+1)(n+2)}\right] = n, \forall n \in \mathbb{N}^*$ **2p**
- 3. a)** $a \leq b \Rightarrow \sqrt[3]{a} \leq \sqrt[3]{b}, \forall a, b \in \mathbb{R}$ **1p**
 $a\sqrt[3]{a} + b\sqrt[3]{b} - a\sqrt[3]{b} - b\sqrt[3]{a} \geq 0$ **1p**
 $(\sqrt[3]{a} - \sqrt[3]{b})(a - b) \geq 0, \forall a, b \in \mathbb{R}$ **2p**
- b)** $\log_a b > 0, \forall a, b \in (0, 1)$ **1p**
- $\sqrt{\log_a b} \leq \frac{\log_a b + 1}{2} = \log_a \sqrt{ab}, \forall a, b \in (0, 1)$ **2p**
- 4.** $\lg y = \frac{1}{1 - \lg x}$ și $\lg z = \frac{1}{1 - \lg y}$ **3p**
- Finalizare..... **4p**