

CONCURSUL NAȚIONAL DE MATEMATICĂ APLICATĂ

"ADOLF HAIMOVICI" etapa locală – 21 februarie 2016

Filiera tehnologică : profil tehnic - CLASA a X-a

BAREM DE NOTARE

1. $(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$ 1p.
 $(\sqrt[3]{4-x} + \sqrt[3]{x-2})^3 = 2^3$ 1p.
 $2 + 6\sqrt[3]{(4-x)(x-2)} = 8$ 2p.
 $(4-x)(x-2) = 1$ 1p.
 $X^2 - 6x + 9 = 0$ 1p.
 $X_{1,2} = 3$ 1p.
2. $2^x = a, 3^y = b$ 1p.
 $ab + 1 = \frac{13b}{3}$ si $ab + 1 = \frac{13a}{4}$ 1p.
 $a = \frac{4b}{3}$ 1p.
rezolvarea ecuatiei de gradul 2 si aflarea $b_1 = 3, b_2 = \frac{1}{4}$ 1p.
 $b = 3, a = 4$
 $b = \frac{1}{4}, a = \frac{1}{3}$ 1p.
 $\begin{cases} x = 2 \\ y = 1 \end{cases}$ 1p.
 $\begin{cases} x = -\log_2 3 \\ y = -\log_3 4 \end{cases}$ 1p.
- 3.a) $\frac{z_1 z_2}{z_1 - z_2} = \frac{-13 - 13i}{2}$ 1p.
Partea reala - $\frac{13}{2}$ 1p.
b) $|z_1| + |z_2| = 2\sqrt{13}$ 1p.
c) $(\frac{z_1 - z_2}{\sqrt{2}})^{1004} = [\frac{(1+i)^2}{\sqrt{2}}]^{502}$ 1p.
 $(\frac{z_1 - z_2}{\sqrt{2}})^{1004} = i^{502}$ 1p.
 $(\frac{z_1 - z_2}{\sqrt{2}})^{1004} = (i^4)^{125} i^2$ 1p.
 $(\frac{z_1 - z_2}{\sqrt{2}})^{1004} = -1$ 1p.
3. Conditii: $\begin{cases} x + \frac{1}{x} > 0 \\ x + \frac{1}{x} \neq 1 \\ 9 - 2^x > 0 \end{cases}$ 1p.
Din conditii obtinem $x \in (0, \log_2 9)$ 1p.
 $x + \frac{1}{x} > 2$ atunci $9 - 2^x > 4^{x-1} + 1$ 1p.
 $2^x = t; t \in (1, 9); t^2 + 4t - 32 < 0$ 1p.
 $t \in (-8, 4)$ 1p.
 $t \in (1, 9) \cap (-8, 4) = (1, 4)$ 1p.
 $x \in (0, 2)$ 1p.