

OLIMPIADA DE MATEMATICĂ - etapa locală - Clasa a VI- a  
Barem de evaluare și notare

**CLASA a VI-a**

**Problema 1.**

a)  $A = 3^{2n+3} \cdot 2^{4n+6} - 2^{2n+1} \cdot 2^{2n+3} \cdot 3^{2n+3}$  ..... 1p

$A = 3^{2n+3} \cdot 2^{4n+4} (2^2 - 1)$  .....1p

Finalizare:  $A = 3^{2n+4} \cdot 2^{4n+4} = (3^{2n+2} \cdot 2^{2n+2})^2$  ..... 2p

b)  $2B = 2 + 2^2 + 2^3 + 2^4 + \dots + 2^{2011} + 2^{2012} \Rightarrow B = 2^{2012} - 1$  ..... 2p

Finalizare:  $B$  de forma  $M4 + 3 \Rightarrow B$  nu este pătrat perfect ..... 1p

**Problema 2.**

a)  $\frac{6}{16 \cdot 22}, \frac{7}{22 \cdot 29}$  ..... 2p

b)  $S = \frac{1}{1 \cdot 2} + \frac{2}{2 \cdot 4} + \dots + \frac{10}{46 \cdot 56} = \frac{1}{1} - \frac{1}{2} + \frac{1}{2} - \frac{1}{4} - \dots + \frac{1}{46} - \frac{1}{56} = 1 - \frac{1}{56} = \frac{55}{56}$  ..... 3p

c)  $T_{100} = \frac{100}{a \cdot b}$  cu  $a = b - 100$  ..... 1p

$b = 1 + 1 + 2 + 3 + 4 + \dots + 100 = 1 + \frac{100 \cdot 101}{2} = 5051$  .....1p

**Problema 3.**

$36 | \overline{abcd} \Rightarrow 4 | \overline{abcd}$  și  $9 | \overline{abcd}$  .....1p

Restul este 2  $\Rightarrow d \in \{7, 2\}$  ..... 1p

Cum  $\overline{abcd}$  divizibil cu 4, obținem  $d = 2$  și  $a = 6$  ..... 1p

$4 | \overline{6bc2} \Rightarrow c \in \{1, 3, 5, 7, 9\}$  ..... 2p

$9 | (6 + b + c + 2)$ , deci  $b$  va fi respectiv: 0, 7, 5, 3, 1, 9 .....1p

Finalizare: numerele sunt 6012, 6732, 6552, 6372, 6192, 6912 .....1p

**Problema 4**

a)  $m(\sphericalangle BAC) + m(\sphericalangle DAE) = 180^\circ$  .....1p

$m(\sphericalangle MAB) + m(\sphericalangle BAE) + m(\sphericalangle EAN) = 90^\circ + \frac{m(\sphericalangle BAC)}{2} + \frac{m(\sphericalangle EAD)}{2} = 180^\circ$  .....1p

$m(\sphericalangle MAN) = 180^\circ$  implică  $A, M, N$  coliniare .....1p

b)  $\sphericalangle BAD \equiv \sphericalangle CAE$  .....1p

$\triangle ABD \equiv \triangle ACE \Rightarrow [BD] \equiv [CE]$  .....1p

c)  $[BC] \equiv [ED] \Rightarrow \triangle ABC \equiv \triangle AED \Rightarrow \sphericalangle BAC \equiv \sphericalangle DAE$  .....1p

Deoarece  $m(\sphericalangle BAC) + m(\sphericalangle DAE) = 180^\circ$  obținem  $m(\sphericalangle BAC) = 90^\circ$  .....1p