Olimpiada Națională de Matematică 2025

Etapa locală 12.02.2025 Giurgiu

Barem de corectare

Clasa a V-a

Solutie Problema1.

a) $3^{2025}\,(\,3^2-1\,)=3^{2025}\cdot 8=(\,3^{675}\cdot 2\,)^3$ = c.p.....2p

b) $6^2=36=1+8+27=1^3+2^3+3^3$
.....2p

c) $A=6\cdot 5^{3n}+5^{3n}\cdot 5+\ 5^{3n}\cdot 5^2=5^{3n}\cdot(\,6+5+25)=5^{3n}\cdot 36=$
.....1p
$=5^{3n}\,(1^3+2^3+3^3)=(\,5^n\,)^3\,(\,1^3+2^3+3^3\,)=$
.....1p
$=(\,5^n\cdot 1)^3+(\,5^n\cdot 2)^3+(\,5^n\cdot 3)^3$
.....1p

Soluție Problema 2.

A= $10^{2025}\cdot(1+2+3+\cdots.+2025)$ .....1 p

$=10^{2025}\cdot 2025\cdot 2026:2$ 1p

$=10^{2025}\cdot 2025\cdot 1013\ \vdots\ 2025$.....1p

a) B= $10^{2025}\cdot(10^2+99+2)$ 1p
$=10^{2025}\cdot 201$ 1p
= 2010000…..0 .....1p
Suma cifrelor este 3 .....1p

Soluție Problema 3:

a + b + c + d = p ,

a - 3 = b + 3 = c * 3 =d : 3 .....2 p

c * 3 = d : 3 | * 3

c * 9 = d => d = 9c

a -3 = 3c => a = 3c + 3

b + 3 = 3c => b = 3c - 3……2 p

3c + 3 + 3c – 3 + c + 9c = p

16c = p……1 p

p = 16 * 1 ; 16 * 4 ; 16 * 6 ;

p = 16 * 1 => c = 1, a = 6, b = 0, d = 0 nu convine……1 p

p = 16 * 4 => c = 4, a = 15, b = 9, d = 36 sunt nr cautate…… 1 p

Soluție Problema 4:

D=I · C+R, R<I

$\overline{abc}$ = $\overline{bc}$ .3 +50, 50< $\overline{bc}$……1p

100a+10b+c =(10b+c).3 +50, $\overline{bc}$>50

100a+10b+c=30b+3c+50

100a =20b +2c+50

50a= 10b+c+25……2p

50a -25= $\overline{bc}$

25(2a-1)= $\overline{bc}$……1p

a =1, $\overline{bc}$ =25 <50

a=2 , $\overline{bc}$=75>50

a=3, $\overline{bc}$=100-imposibil……2p

$\overline{abc}$=275.....1p