**OLIMPIADA DE MATEMATICĂ**
**ETAPA LOCALĂ**
**16.02.2019**
**BAREM**

CLASA a V-a

## Subiectul I

a) 42 42 42 ....... 42 42 42 42 42 42 +110
50 50 50 ....... 50 ___ ___ ___ ___ ___ .....................................1p
42·5+110=320 pixuri ce vor fi redistribuite
320:8=40 cutii, deci in total vor fi 45 cutii .................................................2p
40·50= 2000 pixuri ..........................................................................1p

b) Daca alegem 11 numere, avem 11 resturi la impărțirea lor la 10 .............1p
Sunt 10 resturi posibile 0,1,2, ..., 9 ...........................................................1p
Conform Principiului cutiei, există minim două resturi care se repetă,
deci există cel puțin două pixuri care au aceeași ultimă cifră ....................1p

## Subiectul II

$a\cdot\overline{bc}+1=b\cdot\overline{ac}$ ........................................................................................1p

a(10b+c) +1=b(10a+c) .........................................................................................1p

1=c(b-a) ..............................................................................................................1p

C=1 și b-a=1 .........................................................................................................1p

$\overline{abc}\in\{121, 231, 341, 451, 561, 671, 781, 891\}$ ..........................................2p

$a\cdot\overline{bc}=b\cdot\overline{ac}$ +1

$\overline{abc}\in\{211, 321, 431, 541, 651, 761, 871, 981\}$ ..........................................1p

## Subiectul III

a) $963:9-11\cdot3^2=8$ ......................................................................1p
$[2^{15}\cdot2^{24}+(8)^{13}+(2^3)^{20}:4^{10}]=2^{39}+2^{39}+2^{40}$ ..............................1p
$2^{39}+2^{39}=2^{40}$
$[2^{40}+2^{40}]:2^{41}=1$ ........................................................................1p

b) $2^a + 4^b + 8^c = 16^{100} \leftrightarrow 2^a + 2^{2b} + 2^{3c} = 2^{400}$ ................................1p
$2^a, 2^{2b}, 2^{3c}$ nu pot fi toate egale .......................... .................................1p
$2^a, 2^{2b}, 2^{3c}$ nu pot fi distincte ..............................................................1p
$2^{398} + 2^{398} + 2^{399} = 2^{400}$
a=398, b=199, c=133 ..........................................................................1p

**Subiectul IV**

Resturile posibile sunt 0,1,2,3,4
Suma a 5 resturi consecutive este 10 ..............................................................1p
2019=201· 10 + 9 ..............................................................................1p
Sunt 201 grupe de cate 5 numere consecutive .................................................1p
9=2+3+4=2+3+4+0 ..............................................................................2p
n= minim, deci n=2 ..............................................................................1p
k= minim, deci k+1= 201· 5 +3=1008
k=1007 ..............................................................................................1p