BAREM Clasa a V- a

Subiectul I (20 puncte) :

1.

$a = (2^{20}: 2^{10} - 2^{10} + 10^2 - 2^6 - 6^2)^{2011} + 2011(2011 - 2010)$ …….***3p***

$a = (10^2 - 2^6 - 6^2)^{2011} + 2011$……………………………………….....***2p***

$a = 2011$………………………………………………………………….***1p***

$b = 1$………………………………………………………………………***3p***

$(a - 2010 \cdot b)^{2011} = 1$……………………………………………………….***3p***

$2012\ (a + b) = 2012 \cdot 2012$………………………………………….....***2p***

2012^2 este patrat perfect……………………………………………………….***1p***

2.

$a \cdot 132 + b \cdot 108 + c \cdot 33 = 3(44a + 36b + 11c)/3$……………….***4p***

Concluzia………………………………………………………….***1p***

Subiectul II (20 puncte) :

1.

$\overline{xyzt} = \overline{yzt} \cdot (x + 1) + (x + 2)$……………………………………**2p**

$1000x + \overline{yzt} = \overline{yzt} \cdot (x + 1) + (x + 2)$…………………………**2p**

$999x - 2 = \overline{yzt} \cdot x$…………………………………………………..**2p**

$x/2 \Rightarrow x \in \{1,2\}$……………………………………………………..**2p**

$\overline{yzt} \in \{997,998\}$ ……………………………………………………**2p**

2.

$A = 10^{2011} - 2008 = \underbrace{1 \ldots\ldots\ldots 0}_{2011 ori} - 2008 = 9$…………………..**2p**

$A = \underbrace{9 \ldots\ldots\ldots 9}_{2007\ ori}\ 7992$…………………………………………………**3p**

$2007 \cdot 9 + 7 + 9 + 9 + 2 = 9 \cdot 2007 + 9 \cdot 3$…………………………**3p**

$9 \cdot 2010/2010$…………………………………………………………**2p**

Subiectul III (20 puncte) :

$a + (a + 1) + (a + 2) + (a + 3) + (a + 4) + (a + 5) + (a + 6) + b =$
172……………………………………………………………**2p**

$7a + 21 + b = 172$…………………………………………..**2p**

$7a + b = 151$…………………………………………………**2p**

$7a + b = 7 \cdot 19 + 18$……………………………………..**7p**

$a = 19$………………………………………………………**2p**

$b = 18$…………………………………………………….. . .**2p**

I pitic =19

II pitic =20

III pitic =21

:

:

VII pitic = 25……………………………………………….**3p**

BAREM - Clasa a VI - a

Subiectul I (20 puncte) :

1. a) Efectuarea produsului ……………………………….**3p**

Finalizare…………………………………………….**2p**

b) $2011^2 - 2010^2 = (2011 - 2010)(2011 + 2010) = 2011 + 2010$

$2009^2 - 2008^2 = (2009 - 2008)(2009 + 2008) = 2009 + 2008$

$3^2 - 2^2 = (3 - 2)(3 + 2) = 3 + 2$………………….**3p**

$2011 + 2010 + 2009 + 2008 + \cdots + 3 + 2 + 1 = 1006 \cdot 2011 = 2023066$……….**3p**

2.

$N = (1 + 3 + 3^2 + 3^3) + (3^4 + 3^5 + 3^6 + 3^7) + \cdots + (3^{2008} + 3^{2009} + 3^{2010} + 3^{2011}) = 40 \cdot (1 + 3^4 + \cdots + 3^{2008})$……………………**2p**

Ultima cifra a numarului 3^{4k} este 1, ultima cifra a numarului

$1 + 3^4 + \ldots + 3^{2008} \mathit{este}\ 3$……………………………………….**2p**

Ultimele cifre ale lui N sunt $\overline{\ldots 20}$, deci N nu este patrat perfect pentru ca patratul unui numar cu ultima cifra 0 este de forma $\overline{\ldots 00}$………….**1p**

$$N = (1 + 3) + 3^2(1 + 3) + \cdots + 3^{2010}(1 + 3) = 4\ (1 + 3^2 + \cdots 3^{2010})$$

Deci N divizibil cu 4, care este patratul lui 2………………………….**4p**

Subiectul II (20 puncte) :

a)

$m + 10n + 2p = 82,\ m = 2(41 - 5n - p),\ m\ prim\ \Rightarrow m = 2$………**3p**

$5n + p = 40, p = 5\ (8 - n), p\ prim\ \Longrightarrow p = 5, n = 7$……………….**3p**

b) $\frac{m(\measuredangle AOB)}{2} = \frac{m(\measuredangle BOC)}{7} = \frac{m(\measuredangle COD)}{5} = \frac{140°}{14} = 10°$ ……………………….**4p**

$m(\measuredangle AOB) = 20°, m(\measuredangle BOC) = 70°, m(\measuredangle COD) = 50°$……………..**2p**

c) $m(\measuredangle DOM) = 90°, m(\measuredangle COM) = 40°$……………………………**2p**

(ON bisectoare $\measuredangle COM, m(\measuredangle CON) = m(\measuredangle MON) = 20°$……….**3p**

$m(\measuredangle NOD) = 70°, m(\measuredangle AOD) = 140° \Rightarrow$

$(ON\ bisectoarea\ \measuredangle AOD$…………………………………………**3p**

Subiectul III (20 puncte) :

a) suma cifrelor este : $1 + 2 + \cdots + 9 = 45$………………………**1p**

suma pe linie sau coloana sau diagonala este $45 : 3 = 15$……..**1p**

adunand elementele pe linia, coloana si cele 2 diagonale ce contin x avem :$3x + 45 = 15 \cdot 4 \Rightarrow x = 5$…………………………..**4p**

b) 9 nu poate fi scris intr-un colt al patratului …………………..**2p**

7 nu poate fi scris intr-un colt al patratului …………………….**2p**

c) Scrierea celor 8 patrate magice …………………………….**8p**

Observarea faptului ca 8nu poate fi pe linie cu 9 sau 7………**2p**