

Teste de evaluare

Testul 1

1. a) $9^2 - 3^4 = 81 - 81 = 0$

b) $2012^1 + 1^{2012} = 2012 + 1 = 2013$

c) $25^0 \cdot 0^{25} = 1 \cdot 0 = 0$

d) $(5-2)^3 = 3^3 = 27$

2. a) $16^{28} > 14^{28}$, $16 > 14$

b) $25^{123} < 25^{223}$, $123 < 223$

c) $16^{14} < 8^{21}$

$$\begin{array}{l} 16^{14} = (2^4)^{14} = 2^{56} \\ 8^{21} = (2^3)^{21} = 2^{63} \end{array} \quad \left| \Rightarrow 2^{56} < 2^{63}, 56 < 63 \right.$$

d) $25^{25} > 5^{48}$

$$25^{25} = (5^2)^{25} = 5^{2 \cdot 25} = 5^{50}$$

3. a) $12^{34} : 12^{32} - 3^1 \cdot 3^2 + 2^3 = 12^{34-32} - 3^{1+2} + 8 =$
 $= 12^2 - 3^3 + 8 = 144 - 27 + 8 = 117 + 8 = 125$

b) $2^3 \cdot 3^2 + 25^0 \cdot 11^2 - 4^0 = 8 \cdot 9 + 1 \cdot 121 - 1 = 72 + 121 - 1 =$
 $= 193 - 1 = 192$

c) $1 + \{ 2 + [3 \cdot (4+5) - 6 + 7 \cdot 8] - 9 \} =$

$$= 1 + [2 + (3 \cdot 9 - 6 + 56) - 9] = 1 + [2 + (27 - 6 + 56) - 9] =$$

$$= 1 + [2 + (21 + 56) - 9] = 1 + (2 + 77 - 9) = 1 + (79 - 9) =$$

$$= 1 + 70 = 71$$

$$\begin{aligned}
 d) \quad & 9 \cdot \left\{ \left[8 + 7 \cdot (6 + 5) \right] \cdot 4 - 3 \right\} + 2 = 9 \cdot \left[(8 + 7 \cdot 11) \cdot 4 - 3 \right] + 2 = \\
 & = 9 \cdot \left[(8 + 77) \cdot 4 - 3 \right] + 2 = 9 \cdot (85 \cdot 4 - 3) + 2 = \\
 & = 9 \cdot (340 - 3) + 2 = 9 \cdot 337 + 2 = 3033 + 2 = 3035
 \end{aligned}$$

$$4. \quad a = (3^{21} + 3^{20} + 3^{19}) : 39$$

$$a = [3^{19} \cdot (3^2 + 3^1 + 3^0)] : 39$$

$$a = [3^{19} \cdot (9 + 3 + 1)] : 39$$

$$a = (3^{19} \cdot 13) : 39$$

$$a = (3^{19} \cdot 13) : (3 \cdot 13) = 3^{19-1} \cdot 13^{1-1} = 3^{18} \cdot 13^0$$

$$a = 3^{18} \cdot 1$$

$$a = 3^{18} = 3^{9 \cdot 2} = (3^9)^2 \Rightarrow a \text{ este pătrat perfect}$$

$$5. \quad p = 3^{71} \cdot 4^{62}$$

$$u(p) = u(3^{71} \cdot 4^{62}) = u(3^{71}) \cdot u(4^{62}) = u(3^3) \cdot u(4^2) = 7 \cdot 6 = 42$$

$$3^1 = 3$$

$$3^2 = 9$$

$$3^3 = \dots 7$$

$$3^4 = \dots 1$$

$$\Rightarrow 71 : 4 = 17 \text{ rest } 3$$

$$4^1 = 4$$

$$4^2 = \dots 6$$

$$\Rightarrow 62 : 2 = 31 \text{ rest } 0$$

$$6. \quad 7^x + 7^{x+2} = 2450$$

$$7^x \cdot (1 + 7^2) = 2450$$

$$7^x \cdot 50 = 2450$$

$$7^x = 2450 : 50$$

$$7^x = 49 \Rightarrow 7^x = 7^2 \Rightarrow \boxed{x = 2}$$