

Soluții

1) a) $37 \cdot 48 + 37 \cdot 52 = 37 \cdot (48 + 52) = 37 \cdot 100 = 3700$

sau $37 \cdot 48 + 37 \cdot 52 = 1776 + 1924 = 3700$

b) $x \cdot (a+b) = 144 \Rightarrow x \cdot 18 = 144 \Rightarrow x = 144 : 18 = 8$

c) $2^{10} + 2^8 \cdot 21 = 2^8 \cdot 2^2 + 2^8 \cdot 21 = 2^8 \cdot (2^2 + 21) = 2^8 \cdot 25 =$
 $= (2^4)^2 \cdot 5^2 = (2^4 \cdot 5)^2$ p.p.

2) a) $A = 20 + 280 - 119 = 300 - 119 = 181$

b) $25^{13} : 25^8 \cdot 5^{33} = 25^5 \cdot 5^{33} = (5^2)^5 \cdot 5^{33} = 5^{10} \cdot 5^{33} = 5^{43}$

c) $S = 1 + 3 + 5 + \dots + 99 \Rightarrow (99-1) : 2 + 1 = 50$ termeni

$S = 99 + 97 + 95 + \dots + 1$

$2S = \underbrace{100 + 100 + 100 + \dots + 100}_{50 \text{ ori}} \Rightarrow 2S = 100 \cdot 50 \Rightarrow S = 50^2$ p.p.

3) a) $189 : 13 = 14$ rest 7

Proba: $13 \cdot 14 + 7 = 182 + 7 = 189$

b) $a + b = 143$

$a : b = 4$ rest 3 $\Rightarrow a = 4b + 3 \Rightarrow 4b + 3 + b = 143$

$\Rightarrow 5b = 140 \Rightarrow b = 28 \Rightarrow a = 143 - 28 = 115$

c)
$$\begin{array}{r} 1000 \\ 87 \\ \hline = 130 \\ 116 \\ \hline 14 \end{array}$$

$\Rightarrow 1000 = 29 \cdot 34 + 14 \quad | -7$

$993 = 29 \cdot 34 + 7 \quad | +29$

$1022 = 29 \cdot 35 + 7 \Rightarrow \boxed{1022}$ cel mai mic

$$\begin{array}{r} 9999 \\ 87 \\ \hline = 129 \\ 116 \\ \hline = 139 \\ 116 \\ \hline = 23 \end{array}$$

$\Rightarrow 9999 = 29 \cdot 344 + 23 \quad | -16$

$9983 = 29 \cdot 344 + 7$

$\Rightarrow \boxed{9983}$ cel mai mare.

4) a) $2^{360} = (2^3)^{120} = 8^{120}$; $3^{240} = (3^2)^{120} = 9^{120} \Rightarrow 2^{360} < 3^{240}$

b) $u(a) = u(2^1 + 3^2 + 4^3 + 5^4) = u(2 + 9 + 4 + 5) = 0$

$\Rightarrow a$ este împarțit exact de 10

c) $n : 50 = 3$ rest $r \Rightarrow r < 50 \Rightarrow r \in \{0, 1, \dots, 49\}$

$\Rightarrow n = 50 \cdot 3 + r \Rightarrow n = 150 + r$

$\Rightarrow n \in \{150 + 0, 150 + 1, \dots, 150 + 49\}$

Suma numerelor = $150 + 150 + 1 + \dots + 150 + 49 =$

$= 150 \cdot 50 + 1 + 2 + \dots + 49 = 7500 + 49 \cdot 50 : 2 = \boxed{8725}$