

Varianta 4

• Subiectul I

1. $MDCXLI = 1000 + 500 + 100 + (50 - 10) + 1 + 1 = 1642$

2. 8 robinete ----- 3 ore

4 robinete ----- x ore.

1 robinet ----- $8 \times 3 = 24$ ore

4 robinete ----- $24 : 4 = 6$ ore

R: 6 ore

3. 5, 12, 19, 26

4. $2 \cdot 32 = 64$ sau $3 \cdot 32 = 96$

R: 64 sau 96

5. $(6^9)^7 : 6^{60} - 6^2 = 6^{63} : 6^{60} - 6^2 = 6^{63-60} - 6^2 = 6^3 - 6^2 =$
 $= 6^2 \cdot (6 - 1) = 36 \cdot 5 = 180$

6. R: 3 zile

• Subiectul al II-lea

7. $3^2 + 3^2 \cdot [(3^6)^9 : 3^{51} + 3 \cdot 3^{35} : 3^{34}] : 9^2 =$

$= 9 + 9 \cdot (3^{54} : 3^{51} + 3^{1+35-34}) : 81 =$

$= 9 + 9 \cdot (3^{54-51} + 3^2) : 81 = 9 + 9 \cdot (3^3 + 9) : 81 =$

$= 9 + 9 \cdot (27 + 9) : 81 = 9 + 9 \cdot 36 : 81 = 9 + 324 : 81 =$

$= 9 + 4 = 13$

$$8. \overline{6m12} = ?$$

$$\overline{6m12} : 9 \Rightarrow (6+m+1+2) : 9 \Rightarrow (9+m) : 9$$

$(9+m)$ trebuie să fie un multiplu a lui 9

$$9+m=9 \Rightarrow m=0$$

$$9+m=18 \Rightarrow m=9$$

$$\overline{6m12} \in \{6012; 6912\}$$

$$9. a = 2^{715} + 29^{31}$$

$$u(a) = ?$$

$$u(a) = u(2^{715} + 29^{31}) = u(2^{715}) + u(29^{31}) = u(2^3) + u(9^1) = 8 + 9 = \dots 7$$

$$2^1 = 2$$

$$2^2 = 4$$

$$2^3 = 8$$

$$2^4 = \dots 6$$

$$2^5 = \dots 2$$

se repetă din 4 în 4.

$$715 : 4 = 178 \text{ } \wedge 3$$

$$9^1 = 9$$

$$9^2 = \dots 1$$

$$9^3 = \dots 9$$

se repetă din 2 în 2.

$$31 : 2 = 15 \text{ } \wedge 1$$

• Subiectul al III-lea.

$$10. a : 43 = c \text{ rest } 17$$

a = cel mai mare nr. de 4 cifre

c = câtul împărțirii.

Presupunem că 9999 este nr. nostru:

$$9999 : 43 = 232 \text{ rest } 23 \Rightarrow \text{câtul nostru este } 232$$

$$\text{Deci, nr. nostru este } 232 \cdot 43 + 17 = 9976 + 17 = 9993$$

R: 9993

$$\begin{array}{r}
 11. \quad x \text{ Kg struguri} \quad \text{---} \quad y \text{ Kg c\u00e2r\u0219uni} \quad \text{---} \quad 702 \text{ lei} \\
 46 \text{ Kg struguri} \quad \text{---} \quad 7 \text{ Kg c\u00e2r\u0219uni} \quad \text{---} \quad (84 + \underline{\pi}) \text{ lei} \\
 23 \text{ Kg struguri} \quad \text{---} \quad 13 \text{ Kg c\u00e2r\u0219uni} \quad \text{---} \quad \underline{\pi} \text{ lei} \\
 \hline
 x - (46 + 23) \text{ Kg struguri} \quad \text{---} \quad y - (7 + 13) \text{ Kg c\u00e2r\u0219uni} \quad \text{---} \quad 108 \text{ lei}
 \end{array}$$

$$\underline{I} = 84 + \underline{\pi}$$

$$x - 69 = 3(y - 20)$$

$$702 - 108 = 594 \text{ lei (in } \underline{I} + \underline{\pi} \text{ zi)}$$

$$\underline{I} = 84 + \underline{\pi}$$

$$\underline{I} + \underline{\pi} = 594 \text{ lei}$$

$$\begin{array}{l}
 \underline{\pi} \text{ ---} \\
 \underline{I} \text{ ---} \\
 \hline
 \end{array}
 \left. \begin{array}{l}
 +84 \\
 \end{array} \right\} 594$$

$$594 - 84 = 510 \text{ (2 seq egale)}$$

$$510 : 2 = 255 \text{ lei (a \u0219ncasat \u0219n a } \underline{\pi} \text{ a zi)}$$

$$255 + 84 = 339 \text{ lei (a \u0219ncasat \u0219n } \underline{I} \text{ zi)}$$

$$\begin{array}{r}
 46 \text{ Kg struguri} \quad \text{---} \quad 7 \text{ Kg c\u00e2r\u0219uni} \quad \text{---} \quad 339 \text{ lei} \\
 23 \text{ Kg struguri} \quad \text{---} \quad 13 \text{ Kg c\u00e2r\u0219uni} \quad \text{---} \quad 255 \text{ lei } / \cdot 2 \\
 \hline
 46 \text{ Kg struguri} \quad \text{---} \quad 7 \text{ Kg c\u00e2r\u0219uni} \quad \text{---} \quad 339 \text{ lei} \\
 46 \text{ Kg struguri} \quad \text{---} \quad 26 \text{ Kg c\u00e2r\u0219uni} \quad \text{---} \quad 510 \text{ lei} \\
 \hline
 / \quad \text{---} \quad 19 \text{ Kg c\u00e2r\u0219uni} \quad \text{---} \quad 171 \text{ lei}
 \end{array}$$

$$171 : 19 = \underline{9 \text{ lei}} \text{ (1 Kg c\u00e2r\u0219uni)}$$

$$7 \cdot 9 = 63 \text{ lei (7 Kg c\u00e2r\u0219uni)}$$

$$339 - 63 = 276 \text{ lei (46 Kg struguri)}$$

$$276 : 46 = \underline{6 \text{ lei}} \text{ (1 Kg struguri)}$$

$$x \cdot 6 + y \cdot 9 = 702 \quad | : 3 \Rightarrow 2x + 3y = 234$$

$$x - 69 = 3(y - 20) \Rightarrow x = 3y + 69 - 60 \Rightarrow x = 3y + 9$$

$$2 \cdot (3y + 9) + 3 \cdot y = 234$$

$$6y + 18 + 3y = 234$$

$$9y = 234 - 18$$

$$9y = 216 \Rightarrow y = 216 : 9 \Rightarrow \underline{y = 24} \text{ Kg c\u00e2\u0219uni (erau)}$$

$$x = 3 \cdot 24 + 9 \Rightarrow x = 72 + 9 \Rightarrow \underline{x = 81} \text{ Kg struguri (erau)}$$

$$81 - (46 + 23) = 81 - 69 = \underline{12} \text{ Kg struguri } \underline{\text{mai are de r\u00e2nduit}}$$

$$24 - (7 + 13) = 24 - 20 = \underline{4} \text{ Kg c\u00e2\u0219uni } \underline{\text{mai are de r\u00e2nduit}}$$