

1. Podaj liczbę cyfr liczb:

$$C \left\{ \underbrace{\left\{ \underbrace{\{9-i\}_2}_{i=1}^7, \underbrace{\{j+1\}_4}_{j=1} \right\}}_3 \right\} \dots C \left\{ \underbrace{\left\{ \underbrace{\{9+i\}_2}_{i=1}^7, \underbrace{\{13\}_4} \right\}}_3 \right\} \dots C \left\{ \underbrace{\left\{ \underbrace{\{12+i\}_i}_{i=1}^7, \underbrace{\{j+k\}_3}_{j=1}^2 \right\}}_k \right\}_{k=1} \dots$$

2. Zakoduj ciągi:

a) $\{1, 1, 1, 9, 9, 2, 2, 2, 9, 9, 3, 3, 3, 9, 9, 4, 4, 4, 9, 9\} = \dots$

b) $\{1, 1, 1, 1, 9, 8, 8, 2, 2, 2, 2, 9, 8, 8, 3, 3, 3, 3, 9, 8, 8, 4, 4, 4, 4, 9, 8, 8, 5, 5, 5, 9, 8, 8\} = \dots$

c) $\{1, 9, 9, 9, 2, 2, 9, 9, 3, 3, 3, 9, 9, 9, 4, 4, 4, 4, 9, 9, 9, 5, 5, 5, 5, 9, 9, 9\} = \dots$

d) $\{1, 1, 11, 2, 2, 2, 12, 3, 3, 3, 3, 13, 4, 4, 4, 4, 4, 14, 5, 5, 5, 5, 5, 15\} = \dots$

3.a) $\left\{ \underbrace{\left\{ \underbrace{\{15-i\}_2}_{i=1}^3, \underbrace{\{3+j\}_3}_{j=1}^2 \right\}}_2 \right\}$ ma ... wyrazów. $w_{11} = \dots$ $w_{12} = \dots$ $w_{13} = \dots$

3.b) $\left\{ \left\{ \underbrace{\{2+i\}_3}, \underbrace{\{123\}_2} \right\}_{i=1}^2, \underbrace{\{2+j\}_j}_{j=1}^4, \underbrace{\{7-k\}_3}_{k=1}^5 \right\}$ ma ... wyrazów. $w_{11} = \dots$ $w_{12} = \dots$ $w_{13} = \dots$

4. Oblicz:

a) $S \left\{ \left\{ \underbrace{\{2+i\}_3}_{i=1}^3, \underbrace{\{9-j\}_2}_{j=1}^4 \right\} \right\} = \dots$ b) $S \left\{ \underbrace{\left\{ \underbrace{\{2+i\}_3}_{i=1}^3, \underbrace{\{9-j\}_2}_{j=1}^4 \right\}}_3 \right\} = \dots$ c) $S \left\{ \underbrace{\left\{ \underbrace{\{2+i\}_3}_{i=1}^3, \underbrace{\{9-j\}_2}_{j=1}^4 \right\}}_k \right\}_{k=1}^4 = \dots$

5.a) Oblicz różnicę liczb $S \left\{ \underbrace{\left\{ \underbrace{\{3+i\}_5}_{i=1}^3, \underbrace{\{9-j\}_3}_{j=1}^4 \right\}}_4 \right\} - S \left\{ \underbrace{\left\{ \underbrace{\{1+i\}_5}_{i=1}^3, \underbrace{\{9-j\}_3}_{j=1}^4 \right\}}_4 \right\} = \dots$

5.b) Oblicz różnicę liczb $S \left\{ \underbrace{\left\{ \underbrace{\{3 \cdot i + 5\}_5}_{i=1}^3, \underbrace{\{9 + j \cdot 2\}_3}_{j=1}^4 \right\}}_k \right\}_{k=1}^3 - S \left\{ \underbrace{\left\{ \underbrace{\{2 \cdot i + 4\}_5}_{i=1}^3, \underbrace{\{8 + j \cdot 2\}_3}_{j=1}^4 \right\}}_k \right\}_{k=1}^3 = \dots$

6. Oblicz: a) $S \left\{ \underbrace{\{k+9\}_5, \underbrace{\{10-k\}_5}_{k=3} \right\}^7 = \dots$ b) $S \left\{ \underbrace{\{k+9\}_5, \underbrace{\{10-k\}_5}_{k=3} \right\}_3^7 = \dots$ c) $S \left\{ \underbrace{\{2 \cdot k + 9\}_5, \underbrace{\{9-k\}_5}_{k=3} \right\}_{k=2}^7 = \dots$

7. Oblicz: a) $S \left\{ \underbrace{\{10^k\}_9}_{k=2}^4 = \dots$ b) $S \left\{ \underbrace{\{1\}_{8 \cdot 10^k}}_{k=2}^4 = \dots$ c) $S \left\{ \underbrace{\{10^k\}_6}_{k=2}^4 = \dots$ d) $S \left\{ \underbrace{\{10^k\}_2}_{k=2}^4 = \dots$

8. Oblicz (wynik podaj w postaci ułamka zwykłego nieskracalnego):

a) $S \left\{ \underbrace{\left\{ \frac{1}{10^k}, \frac{3}{10^{k+1}} \right\}}_2 \right\}_{k=1}^\infty = \dots$ b) $S \left\{ \underbrace{\left\{ \frac{2}{10^k}, \frac{1}{10^{k+2}} \right\}}_2 \right\}_{k=1}^\infty = \dots$ c) $S \left\{ \underbrace{\left\{ \frac{1}{10^{2k}}, \frac{-1}{10^{2k+1}} \right\}}_3 \right\}_{k=1}^\infty = \dots$

d) $S \left\{ \underbrace{\left\{ \frac{1}{10^k}, \frac{1}{10^{k+1}} \right\}}_{2+(-1)^k} \right\}_{k=1}^\infty = \dots$ e) $S \left\{ \underbrace{\left\{ \frac{1}{10^k}, \frac{1}{10^{k+1}}, \frac{1}{10^{k+2}} \right\}}_{1+(\text{reszta z dzielenia } k \text{ przez } 3)} \right\}_{k=1}^\infty = \dots$ f) $S \left\{ \left\{ \frac{2}{10^i} \right\}_{i=k}^\infty \right\}_{k=1}^\infty = \dots$

g) $S \left\{ \underbrace{\left\{ \frac{1}{10^{2k}}, \frac{1}{10^{3k}} \right\}}_2 \right\}_{k=1}^\infty = \dots$ h) $S \left\{ \underbrace{\left\{ \frac{1+(-1)^k}{10^k}, \frac{(-1)^{k+3}}{10^{k+2}} \right\}}_{k=1}^\infty = \dots$ i) $S \left\{ \underbrace{\left\{ \frac{3+(-1)^k}{10^{k+(-1)^{k+3}}} \right\}}_{k=1}^\infty = \dots$