PRZYKŁADOWE ZADANIA KONKURSOWE

Task 1. To obtain number 16^{16} you must raise number 4^4 to power:

A) 16^{th} B) 12^{th} C) 8^{th} D) 6^{th}

Task 2. If $4^n + 4^n = 2^{2015}$ than number n equals:

A) 1005 B) 1006 C) 1007 D) 2014

Task 3. For what values of parameter m linear function $f(x) = (1 - 7m^2)x + 2(m - 7)$ is growing?

A) $m \in \left(-\infty, -\frac{\sqrt{7}}{7}\right) \cup \left(\frac{\sqrt{7}}{7}, +\infty\right)$ B) $\left(-\frac{\sqrt{7}}{7}, \frac{\sqrt{7}}{7}\right)$ C) $\left(\frac{\sqrt{7}}{7}, +\infty\right)$ D) $\left(-\infty, \frac{\sqrt{7}}{7}\right)$

Task 4. After a power cut Michael lit four candles. He lit the first candle two minutes after the lights went off. Then Michael kept on lighting the other candles every five minutes one after another. The moment the last candle went out, the lights started working again. How long was the power cut if one candle burns 7 minutes?

A) 24 minutes B) 22 minutes C) 37 minutes D) 35 minutes

Task 5. We want to inscribe one natural number from 1 to 9 in each chess square 3×3 (numbers cannot be repeated) so that the sum of numbers in each line, in each column and in each diagonal should be the same. What number can we inscribe in the central chess square?

A) 2 B) 3 C) 4 D) 5

Task 6. Let us assume that $f: \mathbb{R} \to \mathbb{R}$ is a linear function with the following features $f(2015) - f(2003) = 100$. What is the outcome $f(2051) - f(2015)$?

A) 100 B) 200 C) 240 D) 300

Task 7. If $log_a x^4 = 7$ and $log_a y^3 = 9$, then $log_a(x^2 \cdot y)$ equals:

A) 4,75 B) 6,5 C) 10,5 D) 21

Task 8. A circle was divided into five arcs of different lengths: $3, 5, 7, 9, d$. The angle inscribed on a $3\ cm$ long arc measures $15°$. Therefore:

A) $d = 12$ B) $d = 10$ C) $d = 8$ D) $d = 6$

Task 9. In equation $\frac{E \cdot I \cdot G \cdot H \cdot T}{F \cdot O \cdot U \cdot R} = T \cdot W \cdot O$ different letters represent different digits, and the same letters are assigned to the same digits. How many different values can product $T \cdot H \cdot R \cdot E \cdot E$ have?

A) 0 B) 1 C) 2 D) 3

Task 10. If $f(x) = \frac{2x}{3x+4}$ and $f(g(x)) = x$, then

A) $g(x) = \frac{3x+4}{2x}$ B) $g(x) = \frac{3x}{2x+4}$ C) $g(x) = \frac{2x+4}{4x}$ D) $g(x) = \frac{4x}{2-3x}$

Task 11. Number *b* is 25% less than *c* and 50% greater than *a*. Therefore *c* is bigger from number *a* about:

A. 50% B. 75% C. 100% D. 125%

Task 12. The difference of two triple-digit numbers with the same numbers written in the reversed older is divided by:

A. 2 B. 3 C. 4 D. 5

Task 13. Ula and Ola met at the stud farm on Thursday. Ola goes there every fifth day while Ula goes there every fourth day. What day of the week will they meet next time?

A. on Monday B. on Tuesday C. on Wednesday D. on Thursday.

Task 14. We know that $f(x) = x^2 - x - 12$ and $g(x) = 8 - x$. The greatest number satisfying the inequality $f[g(x)] \leq 0$ is:

A. 15 B.12 C.-12 D.11

Task 15. There are twelve people carrying twelve loaves of bread. Each man is carrying two loaves, each woman – a half of a loaf, and each child – a quarter of a loaf. How many children are there in this group?

A. 1 B. 4 C. 5 D. 6

Task 16. The units digit of a certain triple-digit number is *2*. If you move it to the beginning of this number, you get a triple-digit number lesser by *36*. What is the sum of all the digits of this number?

A. 5 B. 10 C. 9 D 7

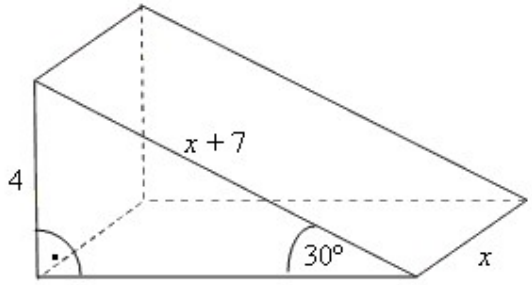
Task 17. The natural number *n*'s greatest divisor other than 1 and *n* is 45 times bigger than its smallest divisor. How many number *n*'s are there?

A. 0 B. 1 C. 2 D.3

Task 18. In 1978 Grzegorz Markowski (the singer of the band Perfect) was five times older than Michał Wiśniewski (the singer of the band Ich Troje). In 1993 Michał Wiśniewski was two times younger than Grzegorz Markowski. In which year the sum of their ages equaled 100?

A. 2010 B. 2013 C. 2014 D. 2015

Task 19. The total area of the triangular prism shown below is:



A) 4(5√3 + 3) **B)** 32√2 **C)** 12(√3 + 1) **D)** 20√3

Task 20. The domain of following function $f(x) = \frac{3x^2-48}{2|x|+50}$ is:

A) $x \in \left(\frac{5}{2}; +\infty\right)$ **B)** $\boldsymbol{x \in \{-5; 5\}}$ **C)** $\boldsymbol{x \in R \setminus \left\{-\frac{4}{5}; \frac{4}{5}\right\}}$; **D)** $\boldsymbol{x \in R \setminus \left\{-\frac{4}{5}; \frac{4}{5}\right\}}$.