1. Real Numbers

Task 1.1. (T 7.2015)

Let us assume that $\frac{15}{16}$ is approximately equal to 0.9. The approximation error expressed as a percentage will be equal to

  A. 4%   **B.** 0,04%   **C.** 3%   **D.** 0,03%

Task 1.2. (T 1.2016)

The following table shows the number of votes received by each candidate in a by-election.

Candidate	I	II
Number of votes	13970	17780

The number of votes received by the winner was higher than the number of votes received by the other candidate by:

  A. 56 percentage points.   **B.** 44 percentage points.

  C. 27 percentage points.   **D.** 12 percentage points.

Task 1.3. (T 2.2016)

If $\log a = \frac{1}{2}$ and $\log b = \frac{2}{5}$, where $a > 0$ and $b > 0$, then the value of the expression $\log(a^2 b)$ equals

  A. $\frac{7}{5}$ **B.** $\frac{4}{10}$ **C.** $\frac{13}{20}$ **D.** $\frac{1}{10}$

Task 1.4. (T 3.2016)

The number $4(4^{18} + 4^{17})$ equals

  A. 4^{35} **B.** 4^{36} **C.** $5 \cdot 4^{17}$ **D.** $5 \cdot 4^{18}$

Task 1.5. (T 1.2017)

It may be assumed that 0.3 is an approximation of $\frac{5}{16}$. What is the percentage error in this approximation?

   A. 2.5%   **B.** 0,025%   **C.** 4%   **D.** 0,04%

Task 1.6. (T 2.2017)

Among those listed below, the only positive number is:

   A. $(-3)^0$ **B.** -3^0 **C.** $(-3)^{2017}$ **D.** -3^{2017}

Task 1.7. (T 10.2018)

In February, the price of a certain product remained constant, but on March 1st it was increased by 10%. After a week, the new price was decreased by 20%. As a result of these two changes, the initial price of the product was decreased by

   A. 12%   **B.** 14%   **C.** 9%   **D.** 4%

Task 1.8. (T.1.2019)

If we assume that $\frac{8}{9}$ is approximately equal to 0.9, the percentage error of this approximation is equal to:

   A. 1%   **B.** 1.25%   **C.** 0.0125%   **D.** 0.01%

Task 1.9. (T.1.2020)

The reciprocal of $3\frac{2}{9} - 5\frac{1}{3} \cdot \sqrt{\frac{49}{144}}$ is:

   A. -9 **B.** $-\frac{1}{9}$ **C.** $\frac{1}{9}$ **D.** 9

Task 1.10. (T 5.2020)

The number $\frac{4^8+4^7}{320\cdot4^4}$ is equal to:

  A. 4^{-1} **B.** 4^0 **C.** 4^1 **D.** 4^2

Task 1.11 (T. 6.2020)

If $\log_3 5 = 0.68$ then $\log_3 45$ equals:

  A. 1.32   **B.** 1.36   **C.** 2.68   **D.** 6.8

Task 1.12 (T 2.2021)

The Seine is shorter than the Vistula by 25%, and the Rhine is longer than the Vistula by 17%. Thus the Rhine is longer than the Seine by

  A. 64%   **B.** 56%   **C.** 42%   **D.** 21%

Task 1.13 (T 18.2021, 0 – 4 pts)

Write down each of the sentences a–d below as an algebraic expression.

  a) The difference of a squared and b.

    ....

  b) The absolute value of the sum of b and tripled a.

    ....

  c) The quotient of a squared and the third power of b.

    ....

  d) The product of a increased by 5 and the square root of b.

    ....

Task 1.14 (T 1.2023)

Complete the sentence. Select the correct answer from the options given below.

$$\frac{2 \cdot 10^{31}}{4 \cdot 10^{17}}$$

is equal to

A. $\dfrac{5^{31}}{10^{17}}$ **B.** $\dfrac{5^{14}}{2}$ **C.** $5 \cdot 10^{13}$ **D.** $2 \cdot 5^{15}$

Task 1.15 (T 2.2023)

Complete the sentence. Select the correct answer from the options given below.

The square of the sum of the numbers 2 and $\sqrt{2}$ is equal to

A. 6 **B.** 8 **C.** $6 + 2\sqrt{2}$ **D.** $6 + 4\sqrt{2}$

Task 1.16 (T 1.2024)

Complete the sentence. Choose the correct answer from the options given below.

The number $(2^8 \cdot 4^4)$ divided by $(2^8 + 4^4)$ gives the quotient

A. 2^4 **B.** 2^7 **C.** $\left(\dfrac{4}{3}\right)^{13}$ **D.** $\left(\dfrac{3}{4}\right)^{12}$

Task 1.17 (T 2.2024)

Complete the sentence. Choose the correct answer from the options given below.

The sum of the numbers $\log_2\left(2\sqrt{2} + 2\right)$ and $\log_2\left(2\sqrt{2} - 2\right)$ is

A. 0 **B.** 1 **C.** 1.5 **D.** 2