

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 $\log(a^2b)$ 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 $\frac{4^8+4^7}{320 \cdot 4^4}$ 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. $\frac{5^{31}}{10^{17}}$ B. $\frac{5^{14}}{2}$ 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. $\left(\frac{4}{3}\right)^{13}$ D. $\left(\frac{3}{4}\right)^{12}$

Task 1.17 (T 2.2024)

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

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

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

Task 1.18 (T 1.2025)

The value of the expression $2 \cdot \log_5 20 - 2 \cdot \log_5 4$ is equal to

- A. -2 B. -1 C. 1 D. 2

Task 1.19 (T 2.2025)

The number

$$\frac{5 \cdot 10^{25}}{25 \cdot 10^{23}}$$

is equal to

A. $\frac{2^{25}}{10^{23}}$

B. $\frac{10^2}{5}$

C. $\frac{2^2}{5}$

D. $\frac{1}{5^2}$

Task 1.20. (T 3.2025)

Marek put 40 000 euros on a three-year deposit account which earned compound interest annually. After the first year, the value of the investment was 105 % of the original amount.

Complete the sentence so that it is true. Write the correct number in the blank.

After the second year, the value of the investment was equal to %
of the original amount

Task 1.21 (T1.2026)

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

The product of $\sqrt{2}$ and $\sqrt[3]{2}$ is equal to

A. $\sqrt[5]{2}$

B. $\sqrt[5]{4}$

C. $\sqrt[6]{2}$

D. $\sqrt[6]{32}$

Task 1.21 (T2.2026)

Decide if the following statements are true (T) or false (F). Mark the appropriate letter.

The opposite number of $\log_{20} 26$ is $\log_{20} \left(\frac{1}{26}\right)$.	T	F
The number $\log_{20} 26$ is less than 1.	T	F

Task 1.22 (T3.2026.)

The price of a certain product was raised twice, each time by 10% of the price at the time.

Complete the sentence so that it is true. Write the correct number in the blank.

The price of the product after the second increase was % higher than the initial price (i.e. before the increases).

Task 1.23 (T4.2026.)

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

The number

$$\frac{3^{25} + 3^{27}}{9^{13} + 9^{14}}$$

is equal to

A. $\frac{3^{52}}{9^{27}}$

B. $\frac{6^{52}}{18^{27}}$

C. $\frac{1}{3}$

D. $\frac{2}{3}$