4. Sequences

Task 4.1 (T 12.2015, 0 – 2 pts)

The sequence (a_n) is an arithmetic sequence defined for $n \geq 1$, with $a_1 = -3$ and $a_5 = 9$. Complete the following sentences.

a) The tenth term of the arithmetic sequence is equal to ..... .

b) The sum of the first ten terms of the arithmetic sequence is equal to ..... .

Task 4.2. (T 16.2016, 0 – 2 pts)

The seventeenth term of a geometric sequence equals 10, while its twentieth term equals -80. Complete the following sentences.

a) The common ratio of this geometric sequence is ..... .

b) The number of terms in this sequence which are in the interval $(0,1)$ equals ..... .

Task 4.3. (T 7.2017)

Numbers $2x, 4x, 18$ (in the given order) are the first three terms of an arithmetic sequence. The first term of the sequence is:

A. 2.25 **B.** 1.5 **C.** 6 **D.** 3

Task 4.4. (T 14.2017, 0 – 3 pts)

The odd-numbered terms of a given geometric sequence (a_n) , where $n \geq 1$, are negative numbers and $a_5 = -1$. Even-numbered terms of the sequence are positive numbers and $a_{10} = \frac{1}{32}$. Complete the following sentences.

a) The common ratio q of the geometric sequence (a_n) is ..... .

b) In the geometric sequence (a_n), the number of terms greater than $\frac{1}{32}$. is ..... .

c) In the sequence (a_n), the sum of integer terms is ..... .

Task 4.5. (T 13.2018, 0 – 3 pts)

The sequence (a_n) is a geometric sequence defined for $n \geq 1$, with $a_1 = \frac{1}{4}$ and $a_4 = 2$. Complete the following sentences.

a) The seventh term of the sequence is ……

b) The product of the second and the eighth term of the sequence is …… .

c) If the sum of n initial terms of the sequence is equal to $\frac{7}{4}$, then the number n is equal to …… .

Task 4.6. (T 17.2018, 0 – 3 pts)

In an arithmetic sequence (a_n) defined for all natural numbers such that $n \geq 1$, the first term is $a_1 = -7$ and the sum of the first twenty terms equals $S_{20} = 1000$. Complete the following sentences.

a) The common difference of this arithmetic sequence is …… .

b) The twentieth term of this sequence is …… .

c) The n −th term of this sequence is given by the formula: $a_n =$ …… .

Task 4.7. (T 6.2019)

In a decreasing geometric sequence (a_n) defined for each natural number $n \geq 1$, the ninth term equals 9, and the seventh term equals 81. Therefore the common ratio q of this sequence

A. $-\frac{1}{3}$ **B.** $\frac{1}{3}$ **C.** 3 **D.** -3

Task 4.8 (T 12.2019)

The n–th term of the sequence (a_n) is given by $a_n = \frac{7-2n}{3}$ for each natural number $n \geq 1$. Therefore this sequence is:

A. an arithmetic sequence, and its common difference equals $r = -\frac{2}{3}$.

B. an arithmetic sequence, and its common difference equals $r = \frac{7}{3}$.

C. a geometric sequence, and its common ratio equals $q = -\frac{2}{3}$.

D. a geometric sequence, and its common ratio equals $q = \frac{7}{3}$.

Task 4.9 (T 16.2019, 0 – 3 pts)

The fortieth term of an arithmetic sequence is 40. The sum of the first forty terms of this sequence also equals 40.

Complete the following sentences with the correct numbers.

a) The first term of the sequence is …… .

b) The common difference of this arithmetic sequence is …… .

c) The number of negative terms in the sequence is …… .

Task 4.10. (T 12.2020)

The sequence (a_n) is given by the formula $a_n = -n^2 + 14n - 42$ for $n \geq 1$. The number of its positive terms is:

A. 0 **B.** 3 **C.** 5 **D.** 12

Task 4.11 (T 13.2020)

In a geometric sequence (a_n) defined for $n \geq 1$, $a_2 = 1$, $a_3 = 1 + \sqrt{5}$. Therefore a_1 is equal to:

A. $\sqrt{5} - 1$ **B.** $\frac{\sqrt{5}-1}{4}$ **C.** $\sqrt{5} + 1$ **D.** $\frac{\sqrt{5}+1}{4}$

Task 4.12 (T 9.2021)

The fourth term of an arithmetic sequence is 7, and the seventh term is 4. The common difference of this arithmetic sequence is equal to

A. -3 **B.** -1 **C.** 1 **D.** 3

Task 4.13 (T 16.2021, 0 – 4 pts)

A sequence (a_n) is given by the formula $a_n = 3n - 5$ for $n \geq 1$. Let T be a set of all two-digit numbers which are terms of the sequence (a_n).

Complete the sentences a – d below by writing the correct numeric values in the blanks.

a) The set T has ..... elements.

b) The arithmetic mean of the elements of the set T is equal to ..... .

c) The median of the elements of the set T is equal to ..... .

d) The set T contains ..... numbers which are squares of integers.

Task 4.14 (T 6.2023)

A sequence (a_n) is given by the formula $a_n = (-1)^{2n-1} \cdot (-2n)$ for each natural number $n \geq 1$.

Decide whether the following statements are true or false. Select 'T' if the statement is true or 'F' if the statement is false.

The third term of the sequence (a_n) is equal to 6.	T	F
All terms of the sequence (a_n) are positive.	T	F

Task 4.15 (T 7.2023)

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

The sequence $(2, x, 8)$ is geometric and is not increasing when

A. $x = -5$ **B.** $x = -4$ **C.** $x = 4$ **D.** $x = 5$

Task 4.16 (T 6.2024)

A sequence (an) is given by the formula $an = 2n2 - 4$ for each natural number $n \geq 1$.

Decide if the following statements are true or false. Select 'T' if the statement is true, or 'F' if it is false.

The sequence (a_n) is arithmetic.	T	F
The sequence (a_n) is increasing.	T	F

Task 4.17 (T 7.2024)

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

The three-term sequence $(x - 2, 6, 12)$ is geometric for

A. $x = 0$ **B.** $x = 2$ **C.** $x = 3$ **D.** $x = 5$