INSTRUCTIONS

1. Please **DO NOT OPEN** the contest papers until the Exams Officer has given permission.

2. There are 20 questions with an open answer in the test.

3. Please write your answers in the ANSWER SHEET.

4. Each correctly solved problem earns 2 points, a partial solution earns 1 point, and unanswered or wrong answer gets 0 points.

5. The use of calculators or other electronic devices, as well as books containing formulae is NOT allowed during the course of the contest.

6. Working time: not more than 60 minutes. In the case of an equal number of solved problems, the higher ranked participant will be the one who has spent less time solving the problems.

7. No contest papers and draft notes can be taken out by any contestant.

8. Students are NOT allowed to receive help by the Exams Officer or by anyone else during the contest.

WE WISH YOU ALL SUCCESS!

Problem 1. What is the smallest three-digit number that is divisible by 8, by 9, and by 12?

Problem 2. What is the smallest possible sum of five different prime numbers?

Problem 3. Calculate the following:
$$(48 \div 4) \div \big((48 \div 6) \div (4 \times 2)\big)$$

Problem 4. Find the highest common factor of the numbers 2353 and 1261.

Problem 5. How many ten-digit numbers of the following type are there, which are divisible by 24? (A and B are digits)
$$\overline{A20182019B}$$

Problem 6. The number $\overline{\ldots zxy}$ is the product of the numbers 2, 3, 5, 7, 9, 10, 11 and 115. Calculate $x + y + z$.

Problem 7. Two ants are moving towards each other at the same speed along a straight line. The distance between them is 4 meters at the moment, and in 3 hours it will be 8 meters. What is the speed of each ant?

Problem 8. At first 99 one cent coins were arranged in a row. After that each second coin was swapped with a 2 cent coin. Then each fifth coin was swapped with a 5 cent coin. How many cents are there in total in the new row of coins?

Problem 9. We have 11 suitcases and 11 keys. At least how many attempts do we need to make in order to match each key to each correct suitcase?

Problem 10. Two children are playing the following game: each of them takes a turn to eat 1, 2 or 3 sweets from a box with 17 sweets. The winner is the one to eat the last sweet. The first child eats 3 sweets on his first go. How many sweets should the second child eat on his first go, to make sure he will win regardless of the moves of the other child?

Problem 11. The area of a rectangle with side lengths of 54 cm and 96 cm is equal to the area of a square. Find the perimeter of the square in centimeters.

Problem 12. What is the greatest number of intersections that 5 straight lines in a plane can have?

Problem 13. An equilateral triangle and a square share a common side. They form a pentagon with a perimeter of 18 cm. Find the perimeter of the triangle in centimeters.

Problem 14. There are two squares with areas 144 cm^2 and 289 cm^2, respectively. The side length of one of the squares is increased by 2 cm, and the side length of the other square is decreased by x cm. Calculate x, if it is known that the two new squares have the same area.

Задача 15. The line segment AB has a length of 1 cm. The midpoint of the segment AB is the point D. The point E is the midpoint of the segment AD. The point F is the midpoint of the segment EB. Find the length of the segment DF in centimeters.

Problem 16. In a game of football:
- the winning team gets 3 points, and the losing team gets 0 points;
- in the case of a draw, each team gets 1 point.

How many different scores can one team get, if they have played 4 games?

Problem 17. How many three-digit numbers are divisible by 3 and have a sum of their digits greater than 21?

Problem 18. How many different remainders can we get when dividing 2019 by a one-digit number?

Problem 19. If the natural numbers N and $N + 3$ have exactly 2 factors each (also natural numbers), find the sum of all prime factors of the number $N + 2019$.

Problem 20. How many four-digit numbers are there, that only contain the digits 1 and 2?