

MATHEMATICS COMPETITION FOR THE SEVENTH
GRADERS OF OULU SUB-REGION, 22–26 FEBRUARY 2021

- The time allotted is 50 minutes.
- The allowed tools are writing and drawing instruments, i.e., pencil, eraser, ruler, and compass. Calculators and mathematical tables are not allowed.
- Each problem has one correct answer. Wrong answers do not reduce points.
- The problems are not ordered by increasing difficulty, but the first problems are likely to be easier than the last ones.

1. Compute $1 - 2 + 3 - 4 + 5$.

- a) -1 b) 0 c) 1 d) 2 e) 3

2. Compute $\frac{2 \cdot 4 \cdot 6 \cdot 8 \cdot 10}{1 \cdot 2 \cdot 3 \cdot 4 \cdot 5}$.

- a) $\frac{1}{2}$ b) 2 c) 32 d) 120 e) 3840

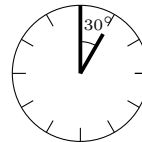
3. How many ways you can color the flag below when you have three colors and adjacent regions must be of different color? You don't have to use all the colours in every coloring.

- a) 3 b) 6 c) 9 d) 12 e) 15



4. When the time is one o'clock the angle between the hands of the clock is 30° . What is the angle between the hands when the time is half past three?

- a) 30° b) 45° c) 60° d) 75° e) 90°



5. Sofia went shopping in three different stores. In the first store she used one third of her money and in the second store she used half of the money she had left. On the way to the third store she found a 10 euro bill which she took for herself. In the third store she used one fourth of the money she had at the moment. After the shopping Sofia had 18 euros left. How much money did Sofia have before she went shopping?

- a) 12 b) 42 c) 72 d) 144 e) 372

6. What is the last digit of number

$$1 + 2 + 3 + 4 + \dots + 2019 + 2020 + 2021?$$

- a) 1 b) 5 c) 7 d) 8 e) 0

7. How many positive two-digit numbers there are so that the product of the digits is greater than the number itself? For example number 29 is not such a number since $2 \cdot 9 = 18 < 29$.

- a) 1 b) 3 c) 5 d) 7 e) None

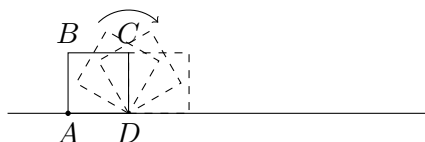
8. We know that ∇ is a number operation. We also know that $5\nabla 3 = 3\nabla 5$ and number $\frac{4\nabla 4}{2\nabla 4}$ is an integer. Which number operation can ∇ be?

- a) Addition b) Subtraction c) Multiplication d) Division e) None of those

9. Matti wants to find out how many matchsticks there are left in his matchbox. He knows that there used to be 70 matches in the box. Matti discovers that by using **all** of the matches left in the box he can form an equilateral triangle, a square or a regular pentagon. How many matchsticks are there left in the matchbox?

- a) 12 b) 25 c) 40 d) 60 e) 70

10. Square $ABCD$ is rolled on a flat surface always around the lower right corner of the square. The square is rolled until vertex A is the lower left corner of the square again. Which pattern does vertex A draw on the plane during the rolling?



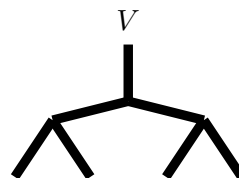
- a)  b)  c)  d)  e) 

11. Jarmo has 1,5 kg of green yarn, 2 kg of white yarn and 3 kg of black yarn. He plans to make as many woolen socks of the yarn as possible. One woolen sock requires 35 g of green yarn, 55 g of white yarn and 70 g of black yarn. Which yarn he runs out of first?

- a) Green. b) White. c) Black. d) Green and black at the same time. e) White and black at the same time.

12. Water is poured into the pipeline below through the input V and the water comes out from the four outputs at the bottom of the pipeline. The pipeline is built of blue and red pipes. Water flows through a blue pipe in 1 second and through a red pipe in 2 seconds. How many ways there are to build the pipeline so that the water comes out from all four outputs at the same time?

- a) 11 b) 12 c) 13 d) 14 e) 15



13. Integers $1, 2, \dots, 10$ are colored by the following rule: If integer a is colored with color V , then none of integers $a + 1, a + 2, \dots, a + a$ is colored with color V . How many colors at least do you need to color integers $1, 2, \dots, 10$?

- a) 3 b) 4 c) 5 d) 6 e) 10

14. Which of the following claims is true?

- a) If an integer is divisible by three then it is always odd.
 b) If an integer is odd then it is always divisible by three.
 c) If an integer is divisible by three then it is always even.
 d) If an integer is even then it is always divisible by three.
 e) None of the claims above is true.

15. One vertex of a square with side-length 5 is at the midpoint of a square with side-length 4. What is the area of the colored region when the length of its vertical side is 3?

- a) 3 b) 4 c) 5 d) 6 e) 7

