

MATHEMATICS COMPETITION FOR THE SEVENTH
GRADERS OF OULU SUB-REGION, 18–22 FEBRUARY 2019

- 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 $-9 \cdot 7 + 198$.

- a) -251 b) 135 c) 53 d) 251 e) 33

2. Compute $1 + \frac{1}{2 + \frac{1}{3 + \frac{1}{4}}}$.

- a) $\frac{1}{10}$ b) $\frac{4}{3}$ c) 1.234 d) $\frac{43}{30}$ e) $\frac{25}{12}$

3. There is a discount offer in a shop: you get six bags of candies for the price of five. One bag costs 3 euros. How many bags of candies can you get with 50 euros?

- a) 16 b) 17 c) 18 d) 19 e) 20

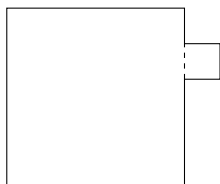
4. Compute $-1 + 2 - 3 + 4 - 5 + 6 - \dots - 2017 + 2018 - 2019$.

- a) -3028 b) 0 c) 2020 d) -1009 e) -1010

5. The leader of a summer camp is informed of the number of participants attending the camp. She immediately notices that there must be at least three participants born in the same month. How many participants are there at least?

- a) 3 b) 12 c) 24 d) 25 e) 36

6. In the picture below, the side length of the bigger square is 5 cm and the side length of the smaller square is 1 cm. Calculate the perimeter of this object.



- a) 5 cm b) 12 cm c) 22 cm d) 24 cm
e) The problem can not be solved with the given information.

7. The price of a digital camera in an electronics store is 100 euros at the beginning. The price of the camera first drops 20 % and then rises 20 %. What is the price of the camera after these changes?

- a) 24 € b) 96 € c) 100 € d) 104 € e) 120 €

8. A square is inscribed inside a circle of radius one (i.e., its vertices are located on the boundary of the circle). What is the area of this square?

- a) 1 b) 2 c) π d) 3 e) $\frac{\pi}{2}$

9. Ulla, Leena, and Ville go for a hiking trip. They drive a car to the starting point of the hiking trail and start walking along the trail with the speed of 6 km/h. After walking ten minutes, they notice that the sausages were left in the car, and Ulla starts jogging along the trail back to the car with the speed of 12 km/h. Meanwhile, Leena and Ville continue walking along the trail with the speed of 6 km/h. How far from the car have Leena and Ville got when Ulla gets to the car?

- a) 1 km b) 2 km c) 1.5 km d) 0.5 km e) 2.5 km

10. A rectangle has been divided into 15 congruent squares, as indicated in the picture. The area of the shaded region is 14. What is the area of the whole rectangle?

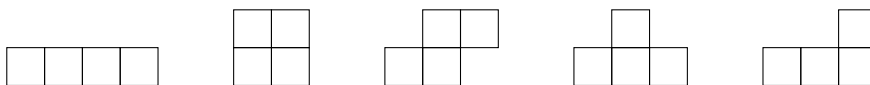


- a) 15 b) 24 c) 30 d) 35 e) 42

11. The sum of the numbers a and b is 42 and their difference is 20. What is the product of the numbers a and b ?

- a) 143 b) 210 c) 341 d) 840 e) 1364

12. Squares of the same size are used to form patterns by attaching them side by side so that every square is attached to another from at least one side. Patterns are interpreted to be the same if they can be formed from each other by rotation or reflection. With four squares one can form the following 5 different patterns:



How many different patterns can be formed using five squares?

- a) 10 b) 12 c) 14 d) 16 e) 18

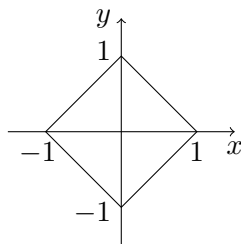
13. Let the side length of a square be s and the radius of a circle be $\frac{s}{2}$. What can be said about the area N of the square and the area Y of the circle?

- a) $N < Y$ b) $N = Y$ c) $N > Y$ d) All of the former e) None of the former

14. Consider the product of n consecutive positive integers, where $n \geq 2$ is a positive integer. Which of the following numbers certainly divides this product?

- a) 3 b) 10 c) n d) All of the former e) None of the former

15. Which of the following equations corresponds to the quadrangle below?



- a) $y + x = 1$ b) $|y| - |x| = -1$ c) $|y| + |x| = -1$ d) $|y| + |x| = 1$ e) $|y| - |x| = 1$