

MATHEMATICS COMPETITION FOR THE SEVENTH  
GRADERS OF OULU SUB-REGION, 28 FEBRUARY – 4 MARCH 2022

- 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  $1 + 22 + 333 + 4444 + 55555$ .

- a) 59245    b) 60355    c) 65432    d) 65555    e) 666666

2. Compute

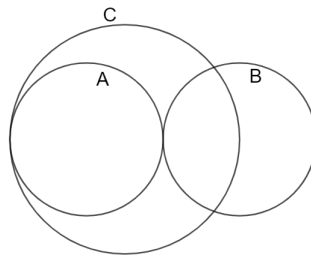
$$\frac{1}{2} + \frac{1}{3} + \frac{1}{6}.$$

- a)  $\frac{1}{11}$     b)  $\frac{3}{11}$     c)  $\frac{1}{5}$     d)  $\frac{5}{6}$     e) 1

3. Huey, Dewey and Louie have chosen together one number between 1-20. Each one of them tells one clue about the number, but one of them is lying. Dewey says, that the number is divisible by seven. Huey says, that the number is divisible by five. Louie says, that the number is divisible by three. Which number did they choose?

- a) 14    b) 15    c) 20    d) 16    e) 9

4. Circles A and B touch each other and they both have radius of 1. Circle C touches circle A as pictured and passes through the center of circle B. Furthermore the touching point of A and C is on the same line as the center points of circles A and B. What is the radius of circle C?



- a) 1    b)  $\frac{4}{3}$     c)  $\frac{3}{2}$     d) 2    e) 3

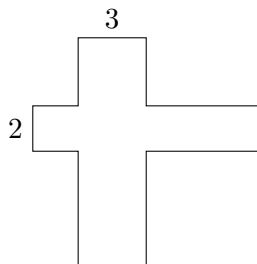
5. How many different ways can number 2022 be written as the sum of two positive integers if the order of the terms doesn't matter? Then, for example, sums  $1 + 2021$  and  $2021 + 1$  are considered as the same way.

- a) 1010    b) 1011    c) 2020    d) 2021    e) 2022

6. Essi and Ossi are 150 meters apart from each other. They start walking towards each other at the same pace. The length of Essi's stride is 70 cm and the length of Ossi's stride is 80 cm. How many steps has Essi taken when they meet?

- a) 94    b) 100    c) 107    d) 188    e) 214

7. What is the area of the figure below, when the height of the figure is 10 units and the width of the figure is 10 units?



- a) 44    b) 48    c) 50    d) 56    e) 60

8. Matti wants to read a book that is 1000 pages long. On the first day he reads one page, and after that, he reads as many pages every day as on the previous days combined. How long does it take for Matti to finish the book?

- a) 7 days    b) 11 days    c) 20 days    d) 35 days    e) 114 days

9. The length of the wall of a square-shaped room is 6 meters. Three square-shaped carpets are laid on the floor. The lengths of the carpets' sides are 3, 4 and 5 meters. What is the biggest area of the part of the floor that is definitely covered by **every** carpet, no matter how they are placed?

- a)  $0,5 m^2$     b)  $1 m^2$     c)  $1,5 m^2$     d)  $2 m^2$     e)  $3 m^2$

10. One mathematician has a peculiar tree in their garden: On a rainy day the tree grows 10 cm, on a sunny day it grows 5 cm and on a cloudy day it grows 1 cm. After a 10-day holiday the mathematician measures that the tree has grown 58 cm. What kind of days were most of the ten days?

- a) Rainy days.    b) Sunny days.    c) Cloudy days.    d) There were an equal amount of each kind of days.    e) The problem can't be solved with the given information.

11. We know that

$$a + b + c + d + e + f + g + h + i + j = 101$$

and

$$a - b + c - d + e - f + g - h + i - j = 39.$$

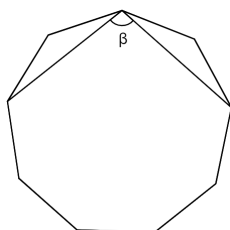
What is  $a + c + e + g + i$ ?

- a) 31    b) 62    c) 70    d) 140    e) The problem can't be solved with the given information.

12. Certain regular polygon  $M$  can be divided by a line segment into two polygons, that have either 7, 8 or 9 interior angles combined. How many interior angles does polygon  $M$  have?

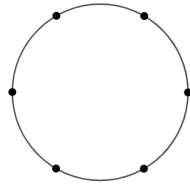
- a) 3    b) 4    c) 5    d) 6    e) 7

13. Two diagonals are drawn into a regular 9-gon as pictured below. What is the angle  $\beta$  between the two diagonals?



- a)  $40^\circ$     b)  $70^\circ$     c)  $90^\circ$     d)  $100^\circ$     e)  $140^\circ$

**14.** There are 6 points on the perimeter of a circle. How many different ways are there of combining the points pairwise with line segments so that none of the line segments intersect each other?



- a) 2    b) 3    c) 4    d) 5    e) 6

**15.** A phone manufacturer knows from experience that 2% of the phones, that are sent from the factory, are faulty. All faulty phones are eventually returned to the manufacturer. If 25% of all the returned phones were faulty already when they left the factory, what percentage of those phones that left the factory flawless are returned?

- a) 2%    b) 98%    c) 75%    d) 6%    e) 27%