Mathematics competition for the seventh graders of Oulu region 2025

- The time allotted is 50 minutes.
- The allowed tools are writing and drawing instruments, i.e. pencil, paper, 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 in increasing difficulty, but the first problems are likely to be easier than the last ones.

1. Compute $2 + 12 + 102 + 1\,002 + 10\,002 + 100\,002 + 1\,000\,002$

a) 11 225 **b)** 111 226 **c)** 1 111 124 **d)** 1 222 224 **e)** 2 222 222

2. Compute $\dfrac{2 \cdot 4 \cdot 6 \cdot 8}{3 \cdot 4 \cdot 5 \cdot 6}$

a) $\frac{1}{2}$ **b)** $\frac{15}{16}$ **c)** 1 **d)** $\frac{16}{15}$ **e)** 2

3. Mona eats 1/2 of a pie, then Ville eats 1/3 of what's left and Lisa eats 1/4 of what's left after Ville has finished. Kalle eats the rest of the pie. What is the fraction of the pie that Kalle eats?

a) 0 **b)** 1/9 **c)** 1/5 **d)** 1/4 **e)** 1/3

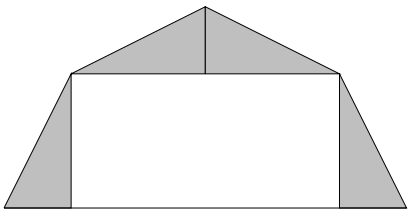
4. There are chickens and pigs in a pen. In total, the animals in the pen have 10 heads and 32 feet. How many chickens and pigs are there in the pen?

a) 2 chickens and 10 pigs **b)** 2 chickens and 8 pigs **c)** 4 chickens and 6 pigs
d) 5 chickens and 5 pigs **e)** 6 chickens and 4 pigs

5. Granny-Liisa always puts either 6 or 7 raisins on a bun when she bakes them. Kaisa, however, doesn't like raisins so she picks them off the buns when eating them. After Kaisa has eaten some buns, she has picked 25 raisins. How many buns did Kaisa eat?

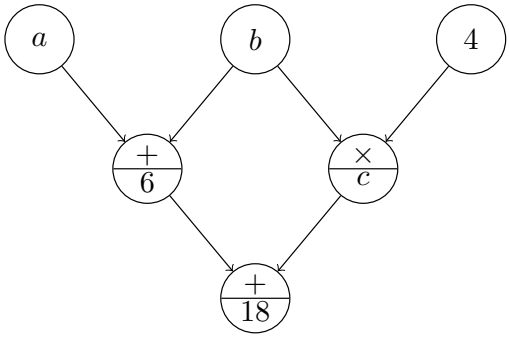
a) 3 **b)** 4 **c)** 5 **d)** 6 **e)** 7

6. The figure below depicts the cross section of a tent. How tall is the tent at its highest point, when the width of the tent at the bottom is 6 meters and each gray triangle in the figure is right-angled and has the same size and shape?



a) 1,5 meters **b)** 2 meters **c)** 2,5 meters **d)** 2,75 meters **e)** 3 meters

7. In the figure below, the number in each two-part circle is obtained by performing the operation in the top part of the circle to the numbers in the circles that are joined to it from above with an arrow. The symbol + denotes addition and × multiplication. Which numbers fit in place of a, b and c?



a) $a = 3,\ b = 3$ and $c = 12$ **b)** $a = 1,\ b = 5$ and $c = 12$ **c)** $a = 3,\ b = 3$ and $c = 10$

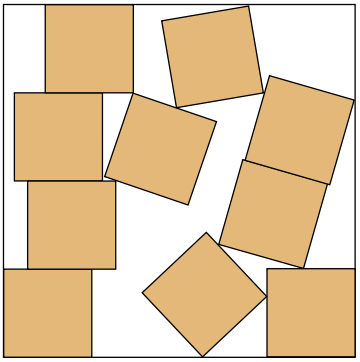
d) $a = 2,\ b = 3$ and $c = 6$ **e)** None of the options given.

8. An integer is called a *prime number*, if it is larger than 1 and it is divisible only by itself and with the integer 1. For example, the integer 3 is a prime number, but the integer 6 is not, since it is divisible by for example 2.

Which of the following triples of integers contains only prime numbers?

a) 2, 6, 11 **b)** 2, 5, 10 **c)** 5, 9, 11 **d)** 6, 9, 12 **e)** 7, 11, 17

9. Square shaped boxes have been placed onto the floor of a square shaped storage room in a manner depicted in the figure below. What is the area of the part of the storage room floor that is left uncovered by the boxes (the white area in the figure), when all of the boxes have a side length of one meter?



a) 4,5 m^2 **b)** 5 m^2 **c)** 5,5 m^2 **d)** 6 m^2 **e)** 7 m^2

10. The long side of a rectangular pen is three times the length of the short side. The area of the pen is 27 m^2. What is the circumference of the pen?

a) 12 m **b)** 24 m **c)** 27 m **d)** 30 m **e)** 48 m

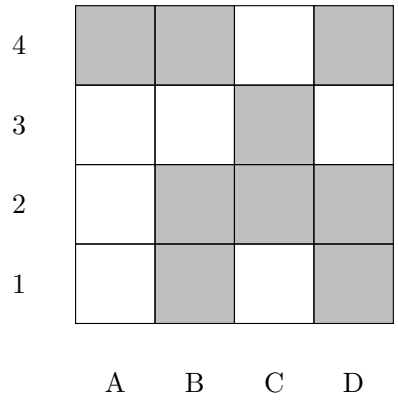
11. Miska goes to the kiosk every day to buy a coffee which costs 1,60 euros. How much money does Miska spend on coffee in a month, if the month has 30 days and Miska gets every sixth coffee for free with a coffee pass?

a) 36 euros **b)** 38,40 euros **c)** 40 euros **d)** 43,20 euros **e)** 48 euros

12. Santeri has chosen a (horrible) password "GOOD" to a certain website. The website requires the user to change their password every month, and a password that has been previously used cannot be used again. Santeri doesn't want to come up with a completely new password every month, so each month he creates a new password by changing the order of the letters of his original password. For how many months can Santeri use this strategy? (The system does not distinguish between lowercase and uppercase letters.)

a) 12 **b)** 16 **c)** 18 **d)** 24 **e)** 64

13. Abraham has placed boxes onto the gray squares in the figure below.



In one of the boxes Abraham has placed a prize. Abraham tells his friend Bertta the row (1–4) on which the prize resides and Carl the column (A–D) of the prize. Bertta knows that Carl knows the correct column and Carl knows that Bertta knows the correct row. Bertta and Carl have the following conversation:

> Bertta: "I dont know which box has the prize, but I know that Carl doesn't know which box has the prize either."
>
> Carl: "At first, I didn't know which box has the prize, but now I do."
>
> Bertta: "In that case, I also know where the prize is."

Which box has the prize?

a) A4 **b)** B1 **c)** C2 **d)** C3 **e)** D2

14. On a table there are objects made out of wood. Twelve of the objects are cubes, ten are painted red, and nine have a letter on them. Additionally, eight of the cubes are painted red, seven of the cubes have a letter on them, five red objects have a letter on them, and there are four red cubes with a letter on them. What is the minimum number of objects on the table?

a) 12 **b)** 13 **c)** 14 **d)** 15 **e)** 16

15. A fast growing plant covers an area of one square meter on Monday morning. During each day, the area which the plant covers doubles in size but on each night between Sunday and Monday, a horde of grasshoppers eats a fraction of 31/32 of the area the plant covers. What is the area which the plant covers after three weeks, after the horde has had their meal?

a) less than 1 m^2 **b)** 64 m^2 **c)** 144 m^2 **d)** 512 m^2 **e)** over 1000 m^2