MATHEMATICS WITHOUT BORDERS

WINTER 2019

AGE GROUP 3

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. Insert brackets to make the calculation correct.

$$12 \div 4 \div 2 = 6.$$

Write down your answer in the answer sheet.

Problem 2. Ivan added all even two-digit numbers smaller than 17, and Peter added all odd two-digit numbers smaller than 16. By how much is Ivan's sum greater than Peter's sum?

Problem 3. How many numbers are missing from the following number sequence?

7, 14, 21, ..., 63, 70, 77

Problem 4. Which one-digit number has the greatest sum of its factors?

Problem 5. How many tens does the number equal to 222 – 23 + 223 – 24 + 224 – 25 + 3 have?

Problem 6. A sports club has more than 24 children who are members. The number of girls is twice that of the boys. At least how many members does this club have?

Problem 7. I know 29 children who were born in the same month. How many of these children were definitely born on the same day of the week?

Problem 8. How can we get the number 100 by using five digits 1 and some arithmetic symbols? Write down your answer in the answer sheet.

Problem 9. We have 3 keys and 3 briefcases. At least how many attempts should we make in order to match each key to each briefcase? (It is not necessary to open the briefcases)

Problem 10. A mother invited all 3 of her daughters and all of their children to her house. Each of her daughters has exactly 3 children. How many people were there in the house in total?

Problem 11. An isosceles triangle has a perimeter of 50 cm. The length of one of its equal sides is 2 dm. Find the length of its different side in centimetres.

Problem 12. The perimeter of a square is 36 *cm*. The side length of a rectangle is equal to the side length of the square, and the width of the rectangle is 1 *cm* shorter than its length. Find the perimeter of the rectangle in centimeters.

Problem 13. Find the smallest number of straight lines that would be necessary in order to form 3 rectangles?

Problem 14. Four different points - A, B, C and D have been placed along the same straight line, and are such that $AB = 7$ *cm*, $AD = 4$ *cm*, $AC = 4$ *cm*. What is the distance between the points B and D in centimetres?

Problem 15. A rectangle with a perimeter of 48 *cm* has been divided into 5 identical squares. Find the perimeter of the square in centimetres.

Problem 16. For how many three-digit numbers is the following statement true?
"After erasing the ones digit, we get a number smaller than 15."

Problem 17. How many two-digit numbers are divisible by 3, but are not divisible by 6?

Problem 18. Ivan has seven $1 coins, two $2 coins and two $5 coins. In how many ways can he pay for a book that costs $10 without having to get change?

Problem 19. How many three-digit numbers have 6 as the product of their digits?

Problem 20. At least how many of the integers 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 should we choose randomly so that at least 2 among them would have a sum of 14?