ARCHIMEDES MATH COMPETITION

First Round 2022-2023

Grade 6

Problem №1.

One side of a triangle has length 6.3 and an other side 1.7. How many integer values are possible for the length of the third side?

A) 1 B) 2 C) 3 D) 4 E) 5

Problem №2.

In the table the sum of the entries of each columns, rows, and diagrams are equal to 42. Find the value of c.

c		
	$2x+2$	x
12		20

A) 6 B) 8 C) 10 D) 12 E) 14

Problem №3.

Set $A = \{-7, -6, -5, -4, -3, -2, -1, 1, 2, 3\}$. What is the probability that product of two randomly selected numbers is positive number?

A) $\frac{1}{15}$ B) $\frac{4}{15}$ C) $\frac{7}{15}$ D) $\frac{8}{15}$ E) $\frac{14}{15}$

Problem №4.

A four-digit number $53xy$ is divisible by 3, 4, and 5. What is the sum of all possible x values?

A) 4 B) 7 C) 11 D) 12 E) 13

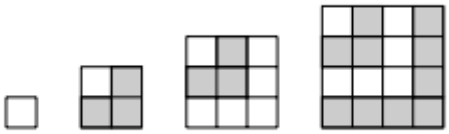
Problem №5.

In a triangle PQR, if $PQ + QR = 10$ cm, $QR + PR = 12$ cm and $PR + PQ = 16$ cm, then the perimeter of the triangle is?

A) 18 B) 19 C) 20 D) 21 E) 22

Problem №6.

Based on the pattern, find how many more shaded squares than unshaded squares will be in the 50th diagram in the sequence.



A) 50 B) 60 C) 80 D) 100 E) 150

Problem №7.

The last two digits of n (when written in base 10) are 99 and n has exactly six positive divisors. How many divisors does $100n$ have?

A) 24 B) 30 C) 54 D) 600 E) The answer depends on n

Problem №8.

How many integers n satisfy the double inequality?

$$\frac{5}{19} < \frac{6}{n} < \frac{1}{2}$$

A) 10 B) 12 C) 16 D) 18 E) None of the preceding

Problem №9.

Suppose a, b, c and d are positive integer such that $a + \frac{1}{b+\frac{1}{c+\frac{1}{d}}} = \frac{23}{7}$.

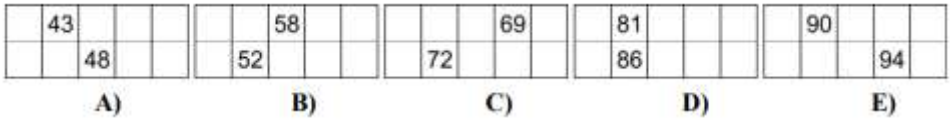
Find $a + b + c + d$.

A) 4 B) 5 C) 6 D) 7 E) 8

Problem №10.

Kamila wrote down all of the numbers from 1-100 one after the other in a table with 5 columns. A part of the table is shown. Her brother cut out a piece of the table and erased some of the numbers. Which of the following could this piece have been?

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20



Problem №11.

A rectangular box has integer side lengths in the ratio of $1:\frac{3}{2}:2$. Which of the following could be the volume of the box?

A) 136 B) 148 C) 160 D) 192 E) 204

Problem №12.

If $A = \frac{21}{19} + \frac{11}{29}$, then which of the following equals $\frac{18}{29} - \frac{2}{19}$?

A) 2-A B) 1-A C) A D) A+1 E) A+2

Problem №13.

The first page number of a book is 1. The sum of page numbers in the book is less than 2020. If there were 1 more page, then the sum of page numbers in the book would be more than 2020. Find the number of pages of the book.

A) 59 B) 60 C) 61 D) 62 E) 63

Problem №14.

The sum of all integers from -13 to 14 (including -13 and 14) is A. The product of all these integers is B. Find $A + B$.

A) 0 B) 13 C) 14 D) 12584 E) None of the preceding

Problem №15.

For how many positive values of n are both $\frac{n}{3}$ and $3n$ three-digit integers?

A) 12 B) 15 C) 18 D) 21 E) 24