ARCHIMEDES MATH COMPETITION

First Round 2022-2023

Grade 4

Problem №1.

In the diagram, each of the 5 boxes is to contain a number. Each of the three numbers in the three middle boxes (including 28) is equal to the average of the number to its left and the number to its right. What number must occupy the box labeled e?

4			28	e

A) 32 B) 34 C) 36 D) 38 E) None of preceding

Problem №2.

Two years ago the cats Tim and Tom were together 15 years old. Now Tom is 13 years old. In how many years will Tim be 9 years old?

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

Problem №3.

A cube of edge length 4 cm is painted green on all faces. It is then cut into 64 identical unit cubes. How many unit cubes have paint on exactly two faces?

A) 24 B) 28 C) 32 D) 36 E) None of preceding

Problem №4.

How many different isosceles triangles have integer side length and perimeter 17?

A) 3 B) 4 C) 5 D) 6 E) 8

Problem №5.

In the addition problem below, the letters A and B represent different digits. What is the value of $A + B$?

$$\begin{array}{cccc} & 7 & 7 & B \\ & 5 & A & B \\ + & A & A & B \\ \hline 1 & 8 & B & 7 \end{array}$$

A) 12 B) 13 C) 14 D) 15 E) 16

Problem №6.

An integer N has 10 positive divisors. If 2N has 15 positive divisors and 3N has 20 positive divisors, how many positive divisors does 4N have?

A) 12 B) 20 C) 30 D) 36 E) 40

Problem №7.

The point in the 3×3 grid below are equally spaced horizontally and vertically. How many squares of any size can be formed by connecting four of the points?

A) 14 B) 15 C) 18 D) 20 E) 21

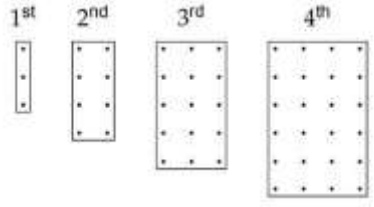
Problem №8.

Julia has 9 sweets and Katharina has 17 sweets. How many sweets does Katharina have to give to Julia so that they both have the same amount of sweets?

A) 2 B) 3 C) 4 D) 5 E) 6

Problem №9.

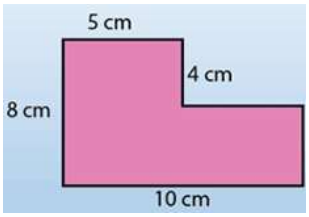
A magic number represents the number of dots in a rectangle containing two more rows than columns. The first four magic numbers are 3, 8, 15 and 24. What is the 20^{th} magic number?



A) 341 B) 360 C) 399 D) 440 E) 489

Problem №10.

Find the area of this figure, in $\boldsymbol{cm2}$.



A) 80 B) 60 C) 40 D) 20 E) 10

Problem №11.

On the playground some children measure the length of the playground with their strides. Anni makes 15 strides, Betty 17, Denis 12 and Ivo 14. Who has the longest stride?

A) Anni B) Betty C) Denis D) Ivo E) Not to possible to answer

Problem №12.

Which number must replace the question mark, if the total of the numbers in each row is the same?

1	2	3	4	5	6	7	8	9	10	199
11	12	13	14	15	16	17	18	19	20	?

A) 99 B) 100 C) 209 D) 289 E) 299