ARCHIMEDES MATH COMPETITION

Additional Late Round 2024

Grade 7

Problem №1.

How many integers between 200 and 700 are perfect squares and perfect cubes?

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

Problem №2.

Stephen had a 10:00 am appointment 60 km from his home. He averaged 80 km/h for the trip and arrived 20 minutes late for the appointment. At what time did he leave his home?

A) 9:35 B) 9:40 C) 9:50 D) 10:50 E) 10 :20

Problem №3.

Triangle ABC has an area of 24 square units. Point D is on side BC, and DC:BD=5:3. What is the area of triangle ADC?

A) 15 B) 9 C) 3 D) 8 E) 4

Problem №4.

A two-digit positive integer, represented by $\overline{ab}$ where a is the digit in the tens place and b is in the digit in the ones place, has the property that when 109 is divided by $\overline{ab}$, the remainder is 4.

If $\overline{ab}$ is not divisible by 5, what is the value of $a + b$?

A) 3 B) 4 C) 5 D) 6 E) 7

Problem №5.

In a magic square, the numbers in each row, each column, and on each diagonal have the same sum. The odd numbers from 5 to 21, both inclusive, are used to build a 3 by 3 magic square.

If 5, 9 and 17 are placed as shown, what number is written in the place of X?

	5	
9		17
X		

A) 9 B) 10 C) 11 D) 12 E) 13

Problem №6.

How many positive integers are there which are less than or equal to 1,000 and may be written without the digits 7, 8, or 9?

A) 342 B) 380 C) 600 D) 800 E) 880

Problem №7.

Six-digit number $\overline{47A94B}$ is divisible by 72. Find the value of $A - B$.

A) 0 B) 1 C) 2 D) 3 E) 4

Problem №8.

A palindrome is a positive integer that can be read either backward or forward. For example, 1, 22 and 303 palindromes. What is the number of palindromes less than 1000?

A) 36 B) 72 C) 90 D) 99 E) 108

Problem №9.

If x, y and z are all integers from 0 to 6 and $x + y + z = 16$, then how many different solutions (x, y, z) are possible ?

Problem №10.

An item which normally sells for $150 is on sale for $108. What is the percent of discount for the sale price?

Problem №11.

Write numbers in the boxes below so that the sum of the entries in each three consecutive boxes is 2024.What is the number that goes into the leftmost box?

Problem №12.

The difference of two numbers is 966. When the larger number is divided by the smaller one, the quotient is 25 and the remainder is 6. What is the smaller number?

Problem №13.

$\overline{ab}$ is a two-digit number where the ratio of **a** to **b** is 1:2. How many such numbers are possible?

Problem №14.

Alfred picks a number from 10 to 30. Brian adds 10 to this number and calls his result B. Christine subtracts 10 from Alfred's number and calls her result C. What is the value of $B - C$?

Problem №15.

The product of 20^{50} and 50^{20} is written as an integer in expended form. How many zeroes appear at the end of that integer?