Grade 10

Problem №1.

Holmes owns two suits: one black and one tweed. He always wears either a tweed suit or sandals. Whenever he wears his tweed suit and a purple shirt, he chooses to not wear a tie. He never wears the tweed suit unless he is also wearing either a purple shirt or sandals. Whenever he wears sandals, he also wears a purple shirt. Yesterday, Holmes wore a bow tie. What else did he wear?

A) black suit and sandals B) tweed suit and sandals

C) sandals and purple shirt D) black suit and purple shirt

E) tweet suit and purple shirt

Problem №2.

Pete and his brother, Jason, decided to buy a gift for their mom for her birthday. When they were talking about what to buy, their dad overheard their conversation, and decided that the three of them should buy a book together.

The amount that Pete and Jason contributed together was one-third of the final price, and Pete alone paid one-third of what Jason and their dad paid together. If Jason's contribution was 100 dollars, what was the total cost of the book?

A) 1000 B) 1400 C) 1200 D) 1450 E) 1500

Problem №3.

Old McDonald has three kinds of ducks on his duck farm: normal ducks, lame ducks, and sitting ducks. Normal ducks have two legs, lame ducks have one leg, and sitting ducks have no legs.

On his duck farm, the 99 ducks have a total of 100 legs. Given that there are half as many sitting ducks as normal ducks and lame ducks put together, find the number of lame ducks on Old McDonald's duck farm.

A) 23 B) 45 C) 36 D) 32 E) 54

Problem №4.

Mr. Smithson gave the following assignment to his 10^{th} grade class:

> *"Make a list of all three-digit numbers that contain 0 at least once and one of its digits appear at least twice."*

How many numbers follow Mr. Smithson's criteria that are also divisible by 4?

A) 15 B) 12 C) 18 D) 20 E) 24

Problem №5.

In an election, Harold received 60% of the votes and Jacquie received all the rest. If Harold won by 24 votes, how many people voted?

A) 125 B) 150 C) 135 D) 140 E) 120

Problem №6.

Marina has 32 coins, consisting of 5-cent, 10-cent, and 25-cent coins.

Given that the total value of her coin collection is 390 cents and she has 4 more 10-cent coins than 5-cent coins, how many 25-cent coins does she have?

A) 6 B) 8 C) 10 D) 5 E) 7

Problem №7.

When N number of candies were distributed among seven people so that each person received the same number of candies and each person received as many candies as possible, there were 3 candies left over.

If instead, 3N number of candies were distributed among seven people in this way, then how many candies would have been left over?

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

Problem №8.

At the start of a 5-hour trip, the odometer in Karl's car indicated that his car had already been driven 13831 kilometers. He noted that the integer 13831 is a palindrome, because it is the same when read forwards or backwards. At the end of the 5-hour trip, the odometer reading was another palindrome. If Karl never drove faster than 80 km/h, what was his greatest possible average speed?

A) $62\,\frac{km}{h}$ B) $45\,\frac{km}{h}$ C) $38\,\frac{km}{h}$ D) $56\,\frac{km}{h}$ E) $68\,\frac{km}{h}$

Problem №9.

Karl leaves school at the same time every day. If he cycles at the constant speed of 20 km/h, he arrives home at exactly 4:30 in the afternoon. If he cycles at the constant speed of 10 km/h, he arrives home at exactly 5:15 in the afternoon.

At what speed, expressed in km/h, must he cycle to arrive home at exactly 5:00 in the afternoon?

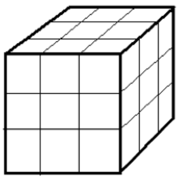
A) 8 $\frac{km}{h}$ B) 10$\frac{km}{h}$ C) 12 $\frac{km}{h}$ D) 14 $\frac{km}{h}$ E) 16 $\frac{km}{h}$

Problem №10.

A cube with 3-cm long edges is cut into smaller cubes with the following rules in mind:

The edge of all smaller cubes is an integer.

Not all smaller cubes are identical.

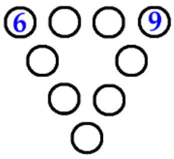


Into how many smaller cubes was the 3-cm edge cube cut?

A) 14 B) 8 C) 15 D) 18 E) 20

Problem №11.

Each of the integers 1 through 9 is to be placed in one of the nine given circles so that the sum of the four numbers along each side of the triangle is the same. Two of the numbers are shown.



What is the **sum** of the four numbers along a side?

A) 30 B) 25 C) 21 D) 18 E) 32

Problem №12.

When counting from 3 to 201, the number 53 is the 51st number counted. When counting backwards from 201 to 3, the number 53 is the n^{th} number counted. Find the value of n.

A) 149 B) 148 C) 150 D) 152 E) 146

Problem №13.

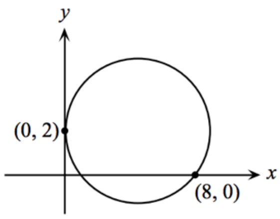
The length, width, and height of a rectangular prism form an arithmetic sequence with common difference of 3.

Given that volume of this prism is 440 cm^3, what is its surface area?

A) 306 B) 256 C) 346 D) 366 E) 286

Problem №14.

The circle shown is tangent to the y-axis at point (0,2) and its larger x-intercept is 8. What is the radius of the circle?

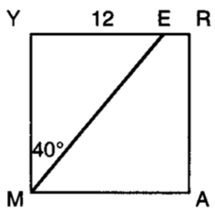


Express your answer in decimal form, without rounding.

A) 3.45 B) 4.25 C) 3.2 D) 4.85 E) 5.5

Problem №15.

In the diagram shown, the segment ME in square MARY is drawn to connect vertex M with a point on side RY such that angle EMY measures 40 degrees and side EY measures 12 units.



What is the area of quadrilateral MARE?

A) 119 B) 121 C) 115 D) 108 E) 124