Grade 9

Problem №1.

On the last day of school, Mrs. Lasalle gave jelly beans to her class. She gave each boy as many jelly beans as there were boys in the class. She gave each girl as many jelly beans as there were girls in the class. She brought 400 jelly beans, and when finished, she had six jelly beans left. There were two more boys than girls in her class. How many students were in her class?

A) 26 B) 28 C) 30 D) 32 E) 34

Problem №2.

The 20 problems in a modified version of Archimedes Competition are scored by awarding 5 points for each correct answer, 0 points for all problems unanswered and a deduction of 2 points for each incorrect answer. In this system, Yuki scored 62 points. How many problems did she leave unanswered?

A) 6 B) 8 C) 2 D) 10 E) 4

Problem №3.

On a local farm, there are geese, sheep, and roosters. The ratio of geese to sheep is 7:15 and the ratio of sheep to roosters is 3:2. When we count all the legs and heads of these farm animals, our leg-count is 186 higher than our head-count.

How many more roosters are in the farm than geese?

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

Problem №4.

Charles enters a 12-kilometer charity run with the goal to finish it in 1 hour and 20 minutes. He starts the run jogging at an average speed of 7 kilometers per hour.

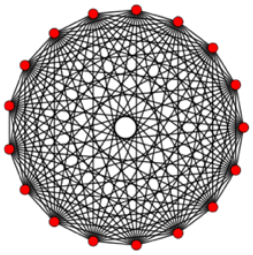
After 30 minutes, he realizes that he needs to increase his speed in order to be able to finish the race in his desired time.

For the remaining time, at what **speed** must Charles run in order to finish the race in *exactly* one hour and 20 minutes?

A) 10.2 B) 10.5 C) 11.3 D) 11.7 E) 12.1

Problem №5.

In geometry, a heptadecagon is a 17-sided polygon. How many diagonals does it have?



A) 84 B) 96 C) 115 D) 119 E) 121

Problem №6.

A trapezoid with an area of 26 square units is drawn on a coordinate plane with the vertices A (x,26), B (6,22), C (14,22), and D (13,26) as shown.

What is the value of x?

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

Problem №7.

What is the sum of all the roots (or solutions) of the following equation?

$$(x-1)(x+2)(x-3)(x+4)\ldots(x-21)=0$$

A) 11 B) 12 C) 13 D) 14 E) 15

Problem №8.

When asked about their ages, a group of five friends refused to respond. However, they did give the sums of the ages of each group of four of them. These were 124, 128, 130, 136, and 142. What is the age of the youngest of these five friends?

A) 20 B) 23 C) 25 D) 31 E) 36

Problem №9.

Jimmy buys a video game at "24 dollars less 12.5%". He then wishes to sell the game at a gain of 25% of his cost after allowing 20% discount on his marked price. At what price should Jimmy's video game be marked? Round your answer to two decimal places.

A) 18.23 B) 83.12 C) 32.81 D) 82.13 E) 28.31

Problem №10.

When the base of a triangle is increased 10% and the altitude to this base is decreased 10%, what is the change in the triangle's area?

(Give your answer as percentage of the original triangle.)

A) 96 B) 97 C) 98 D) 99 E) 100

Problem №11.

Fresh apricots have a moisture content of 80%. When left in the sun to dry, they lose 75% of their moisture content.

What is the **moisture content** of sun-dried apricots, expressed as a percentage?

A) 50 B) 55 C) 60 D) 65 E) 70

Problem №12.

Jack and Jane live on a the same (perfectly straight) road, exactly 48 kilometers away from each other. At 8:30 in the morning they both start cycling towards each other's house, Jack at the speed of 26 km/h and Jane at the speed of 30 km/h.

At the same time, a fly starts flying from Jack towards Jane at a speed of 7 km/h, turns around instantly when it reaches her, flies back to Jack, turns around instantly, and so forth, back and forth until Jack and Jane finally meet. How much distance, in meters, did the fly fly?

A) 6000 B) 5600 C) 4500 D) 6400 E) 5400

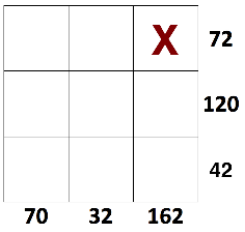
Problem №13.

Two non-parallel and non-congruent lines may divide a plane into a maximum of 4 regions. Into how many regions at most can eight such lines (non-parallel and non-congruent) divide a plane?

A) 35 B) 37 C) 40 D) 28 E) 46

Problem №14.

Use 1, 2, 3, 4, …, 9 once to fill the nine spaces so that, when the three numbers in any row or in any column are multiplied together, the result matches the number at the end of the row or column.

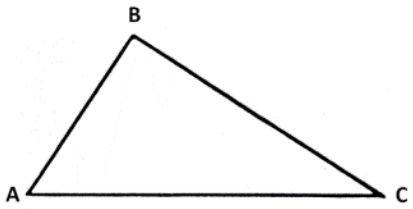


What number is in the place of the **X**?

A) 9 B) 5 C) 3 D) 7 E) 8

Problem №15.

From the scalene triangle in the figure, the lengths of AB and BC are 9 cm and 14 cm, respectively. The size of angle A is 58°. Find the length of AC, in cm.



A) 14.7 B) 15.6 C) 13.2 D) 15.4 E) 16.5