Grade 7

Problem №1.

Mike the merchant is taking eggs to the market to sell. The eggs are in a cart that holds up to 500 eggs. If the eggs are removed from the cart 2, 3, 4, 5, or 6 at a time, one egg is always left over. If the eggs are removed 7 at a time, no eggs are left over.

What is the number of eggs is in the cart?

Problem №2.

On the annual children's day, the price of a small pack of trail mix was reduced from 50 cents a pack to a lower price. Due to this sale, Mr. Friedman decided to buy every single pack the store had in stock so that he'd hand them out to his class as children's day gifts. If he paid exactly 31 dollars and 93 cents in total, how many packs of trail mix did he buy?

Problem №3.

A long-distance bus shuttles tourist across a bridge to an island every day. The first bus leaves the mainland station at 10:00 and the last bus leaves the mainland at 16:00. One day the driver noticed that on the 10:00 bus there were exactly 100 tourists, and that on each successive trip, the number of tourists was 4 less than on the previous trip. How many tourists did the shuttle bus take that day, given that the shuttle bus leaves hourly from the mainland station?

Problem №4.

When visiting Planet Xenon, we noticed that the national inhabitants had a system of numeration identical in structure to ours except they used only the following digits:

$$0, 1, 2, 3, 4, 5, 6, 7$$

Which means, their 10 is our 8, their 11 is our 9, and so on… How could they represent our 100 in their system?

Problem №5.

Find the smallest five-digit number that is divisible by each of its digits, if none of the digits are repeated.

Problem №6.

Natalie folds a piece of paper in half, and then folds it in half again. The resulting twice-folded piece of paper is a 4-centimeter by 5-centimeter rectangle.

What is the **largest possible perimeter** of Natalie's original unfolded piece of paper?
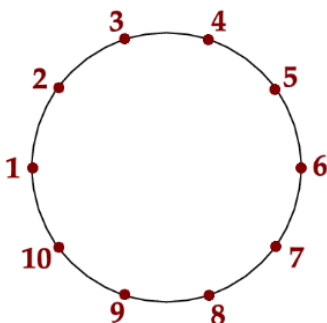
Problem №7.

The following equation is given, with an unknown value, x:

$$\frac{45^{13} - 45^{11}}{22} = 92 \cdot 45^x$$

What is the value of x?

Problem №8.

A chord of a circle is a straight-line segment whose endpoints both lie on the circle.

Ten points are spaced equally around a circle. How many **different chords** can be formed by joining any two of these points?