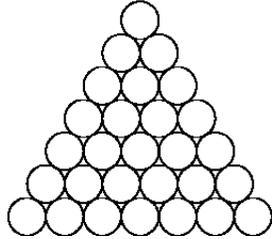**MATH 6. HOMEWORK 15: SNOWDAY**
MISCELLANEOUS PROBLEMS

1. COLORING

1. 28 coins are arranged as shown on the picture below. Every three coins touching each other weigh in total 10g. Find the weight of all coins on the border of the triangle.

2. An ant is crawling by the edges of the cube never turning back. Is it possible that the ant visited one vertex 25 times, and the rest only 20 times?

3. The difference of two integer numbers was multiplied by their product. Is it possible to get 2019?

4. Three hockey pucks, A, B, and C are placed on the hockey field. Each turn, a player hits one of them so that it goes between two others and stops. The player repeats it 25 times. Is it possible that after that the pucks are on their original places?

5. Alex bought a notebook and numbers all its pages from 1 to 192. Nick teared 25 sheets from the notebook, and added all the page numbers, after which he got 2020. Is it possible?

6. There are three heaps of stone. Each turn you're allowed to either add to one of the or subtract from one of them the total number of stones in two other heaps. For example: $(12, 3, 5) \rightarrow (12, 20, 5)$ or $(12, 3, 5) \rightarrow (4, 20, 5)$. Imagine you start with $(2021, 201, 21)$. Can you make one of the heaps empty?

7. A magic tree has 15 bananas and 20 oranges. Each time you can take either one or two fruits. If you take one fruit, the same one reappears, if you take two of the same fruits, an orange grows, and if you take two different fruits, a banana grows.
   (a) In which order do you have to take fruits of the tree so that only one fruit is left at the end?
   (b) Which fruit would it be?
   (c) Is it possible to leave the tree empty?

8. There are 30 students in a class. 9 of them have 3 friends (in this class), 11 of them have 4 friends, and 10 of them have 5 friends. Is it possible?

9. 6 trees grow in a row, with a distance of 10 meters between them. One bird sits on each tree. When one bird flies to a different tree, another bird flies in an opposite direction by the same distance. Can all birds get together on one tree?

10. Students have written on the blackboard 2011 "+" signs end 2011 "−" signs. Every minute a pair of signs is erased and replaced by a single "+" if they were equal or a single "−" if they were different. Can you predict which sign will be written on the board at the end?