



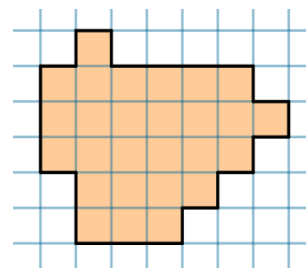
The Israeli Mathematics Olympiad for Grades 5 & 6

Final Round, 2021

1. In the forest there are 3 types of birds: sparrows, pigeons and owls. Half of the birds are sparrows and a third of the birds are pigeons. If every owl will eat an amount of sparrows which is equal to the total amount of owls, there will be no sparrows left. How many pigeons are there in the forest? Explain your answer.

2. Geometrical figures are called *congruent* if they coalesce in overlap (meaning that it is possible to put one on another so that they match). Divide the given shape into 3 congruent parts.

Remark: you can rotate and reflect the shapes for the matching.



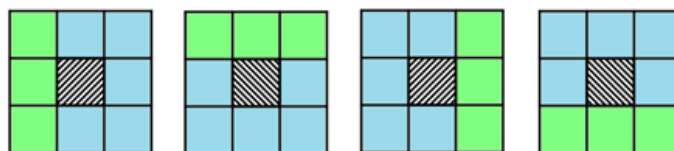
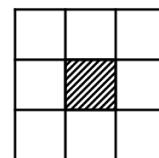
3. A 2-digit number and a 3-digit number are written on the board. When Benny divided the 3-digit number by the 2-digit number, he got a 1-digit number. When he added the 3-digit number with the 2-digit number, he got a 4-digit number. Prove that Benny made a mistake in his calculation.

4. The dragon placed three piles of diamonds and a pair of scales in front of Bilbo. The piles consist of 17, 21 and 27 diamonds. All diamonds look identical, but one of them is fake, and its weight is different than the weight of a real diamond. How can Bilbo pick a pile that doesn't include the fake diamond, using the scales only once?

Remark: a pair of scales has two plates; on the plates, one can put some amount of diamonds and compare their weights.

5. In the drawing there is a frame consisting of 8 cells. Write the numbers 1 to 8 in the cells, without repetition, such that the sum of each row/column of 3 cells will divide the sum of the 5 other cells.

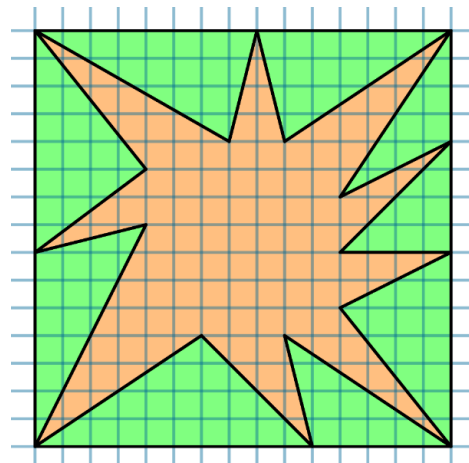
Clarification: in every image, the sum of the numbers in the green cells divides the sum of the numbers in the blue cells.



6. Which area is greater, the orange or the green? Explain your answer.

7. Between the following single-digit numbers, insert arithmetic operation symbols and parentheses such that the resulting equality holds: $1 \square 2 \square 3 \square 4 \square 5 \square 6 \square 7 \square 8 \square 9 = 2021$.

Remark: you are required to insert an arithmetic operation symbol between each pair of consecutive digits. The only symbols allowed are (+, −, ×, :).



Good luck!