

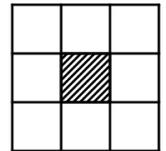


The Israeli Mathematics Olympiad for Grades 3 & 4  
Final Round, 2021

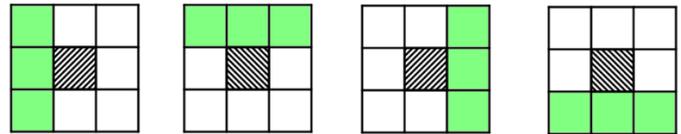
1. Arrange the numbers 1, 2, 3, 4, 5, 6, 8, 9, 10, 12 in a circle, such that in each pair of neighboring numbers, one of them divides the other.

2. A forest contains some number of magical trees. The number of branches of each magical tree equals the number of magical trees in the forest. The number of leaves on each branch equals the number of branches on each tree. The total number of magical trees, branches and leaves in the forest equals 155. How many magical trees are there in the forest?

3. 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 be the same.

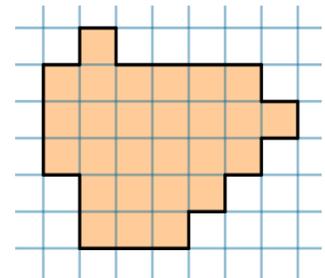


*Clarification: in every image, the sum of the numbers in the green cells should be the same.*



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.

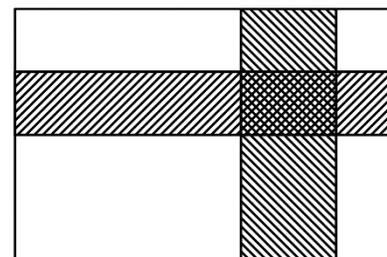
*Remark: you can rotate and reflect the shapes for the matching.*



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?

7. Two carpets of equal area have been laid out in a rectangular hall of area  $240 \text{ m}^2$ . Each carpet is rectangular and extends to opposite edges of the hall. The carpets cross each other as in the figure, and the area which is covered by two layers of carpet is  $15 \text{ m}^2$ . Find the area of each carpet.



**Good luck!**