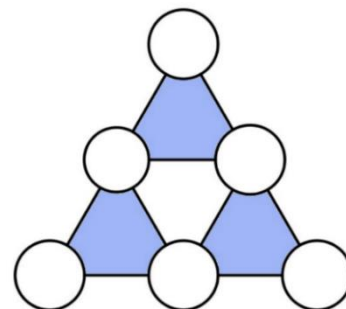# Israeli Mathematical Olympiad – 4th-5th Grades
Final Stage, Year 5783

1. In each of the six circles below, write one of the numbers 1, 2, 3, 4, 5, 6, such that each of the numbers is written exactly once, and the three sums of the numbers around each of the three blue triangles are equal to each other.

2. All corners in the picture have right angles. Additionally, the hatched (black) quadrilateral is a square. Find the perimeter of the blue shape. Explain your answer.
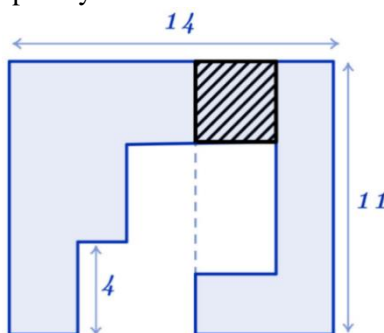
3. A warehouse contains six bags with chocolate candies, weighing 1, 2, 3, 4, 5 and 6 Kilograms. Each bag has its weight written on it. One day, Itay opened one of the bags and *may have eaten* some of the candies from it. Show how using two weightings on a balance scale, it is possible to find out which of the bags, if any, is missing candies?
Note: Itay may have eaten candies with a non-integer weight, and also may not have eaten any candies at all.

4. Asaf, Bar, Carmel, and Dror are siblings. Each is either a knight or a knave.
Knaves always lie and knights always say the truth.

One day, Asaf said: "Among the four of us there are at least two knaves."
Then Bar said: "At least three of us are knaves."

How many of the siblings are knaves? Explain your answer.

5. A triangle is called *isosceles* if at least two of its sides have equal length.
Mark 6 points on the plane so that any three of them form an isosceles triangle. Explain your construction.

6. The number 🌸 is divisible by the number 🍎 and a **different** number 🍐. It is not divisible by any number smaller than 🍎 and 🍐, except 1. It is also known that

$$🍎 × 🍎 + 🍐 × 🍐 = 🌸$$

Find all possibilities for the number 🌸. Explain why there are no more possibilities.

בהצלחה!