



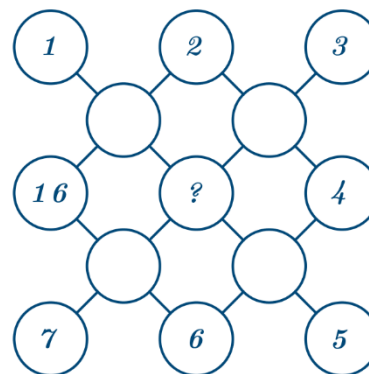
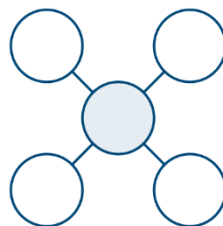
## האולימפיאדה הארצית במתמטיקה לכיתות ז-ח

### שלב א, שנת תשפ"א

1. Consider the following diagram:

Any number in the diagram which is connected to four other number must be equal to their average:

Which number should be written inside the circle marked by “?”?



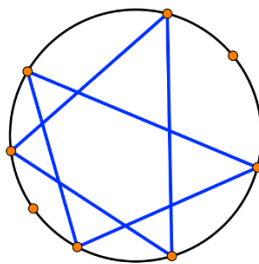
Note: an average of 4 numbers is their sum divided by 4.

2. A point  $D$  is marked on the side  $BC$  of the triangle  $ABC$ . The perimeter of the triangle  $ABC$  is 15cm, the perimeter of the triangle  $ABD$  is 12cm, and the perimeter of the triangle  $ACD$  is 13cm. What is the length of the segment  $AD$ .

3. How many minutes after 7:00 the angle between the hour hand of the clock and the minute hand of the clock will first be exactly one degree?

*Remark. The clock hands move continuously and at a constant speed.*

4. 8 points are given on a circle. In how many different ways can a star of David be drawn with vertices at these points?



*Remark: The Star of David is the shape that is obtained when two triangles intersect and their sides have exactly 6 intersection points overall.*

5. Yossi wrote down 10 consecutive natural numbers on the board. Danny erased one of them. The sum of the remaining numbers equals 2020. Which number was erased?

6. In a street there are 15 houses, colored in either blue, red, or green. There is at least one house of each color. Between any two blue houses there is a red house. Between any two green houses there is a blue house. What is the largest possible number of green houses?