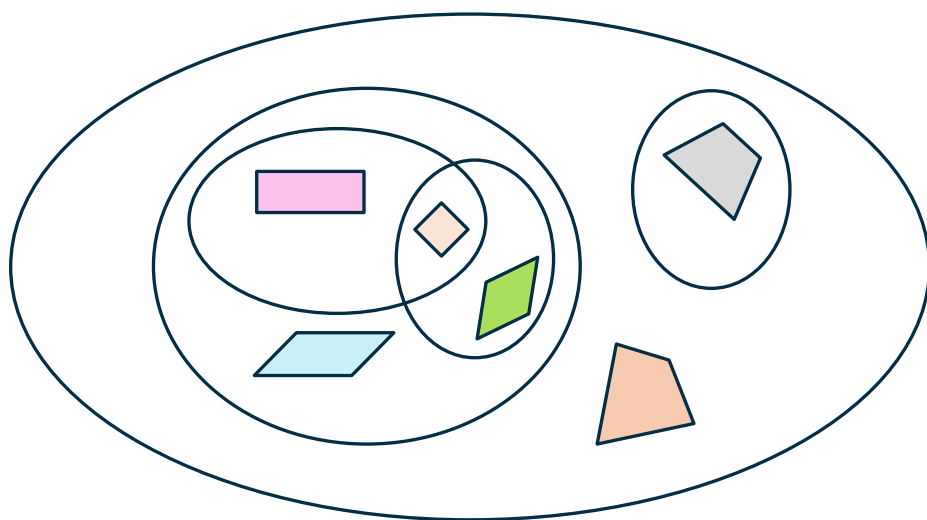


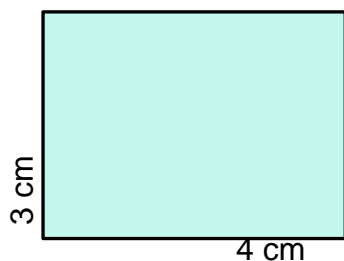
Parallelogram is a quadrilateral which has two pairs of parallel sides.

These parallel sides are equal. Is a rectangle a parallelogram? Is a square a rectangle?  
Is the square a parallelogram?



### Perimeter and area.

**Perimeter of the shape is a sum of the length of all sides of the 2D shape**, or the total length of the edge of the closed part of the plane. Perimeter of a circle or an ellipse is called circumference. It's easy to find perimeter of a rectangle:



$$3 + 4 + 3 + 4 = 2 \cdot 3 + 2 \cdot 4 = 2 \cdot (3 + 4)$$

Or, for a general rectangle:

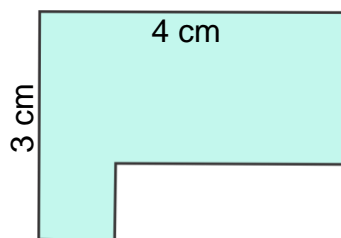
$$P_r = a + b + a + b = 2 \cdot a + 2 \cdot b = 2 \cdot (a + b)$$

The perimeter of a rectangle is twice the sum of its 2 different sides. For square is

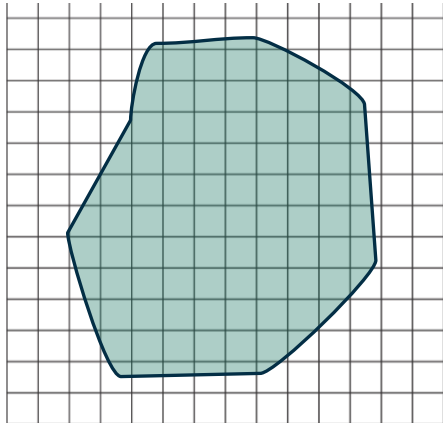
$$P_s = a + a + a + a = 4a$$

What about parallelogram?

1. Find the perimeter of the shape (all angles are right angles):

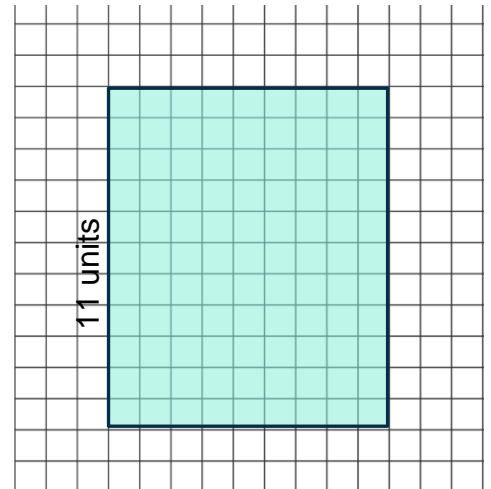


Area of the shape is the measure of part of the plane, covered with the shape.

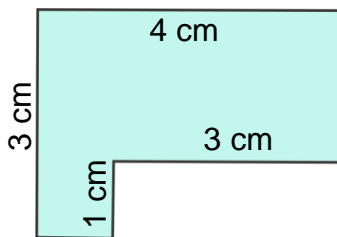


To find the area of the shape we need to find out how many units of area ( $\text{cm}^2$ ,  $\text{m}^2$ ,  $\text{mm}^2$ ) are covered with the figure. We can easily calculate the area of the rectangle:

$$S_r = a \cdot b$$



- Find the area of the shape (all angles are right angles):



Area of a circle.

The ratio of circumference to the diameter is defined as  $\pi$ , the irrational number which can be rounded to 3.14.

$$\frac{l}{2r} = \pi$$

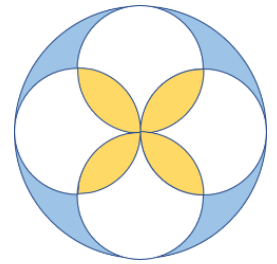
Th area of the circle is

$$S = \pi r^2$$

- How the area of a square will change if we increase the length of the side 2 times? 3 times?  $2\frac{1}{2}$  times? How will change the area of a triangle if each of its side will be increase 2 times? 3 times?
- How the area of the circle will change if the radius is increased two times?

5. On the picture, the radius of the bigger circle is twice as big as the radius of the smaller circles.

Prove that the area shaded blue is the same as the area shaded yellow.



6. Prove that the area of the green square is 13 cm<sup>2</sup> (assuming that the grid is 1 cm in each dimension).

