# 5 Constructing Shapes With the Same Area

Constructing a Parallelogram With a Given Area

If you are constructing a certain type of shape with a given area, you have to take the properties of that shape into account.
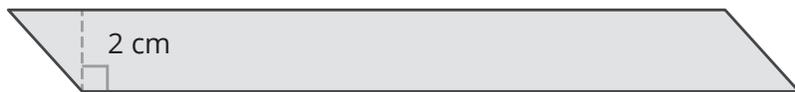
For example, when you construct a parallelogram with an area of 36 cm², you need to make sure that the following statements are true:
- You choose a base and height that multiply to 36.
- Your shape has two pairs of parallel sides.
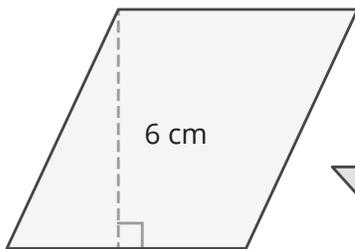
6 cm

6 cm

Area = base × height
Area = 36 cm²

2 cm

18 cm

Area = base × height
Area = 36 cm²

If you are comfortable using decimals or fractions, you can construct a parallelogram with side lengths that are not whole numbers.

1.5 cm

24 cm

Area = base × height
Area = 36 cm²

1.8 cm

20 cm

Area = base × height
Area = 36 cm²

Constructing Rectangles and Squares With a Given Area

When you construct a rectangle with an area of 36 cm^2, you need to make sure that the following statements are true:

- You choose a length and width that multiply to 36.
- Your shape has two pairs of parallel sides.
- The sides meet at 90° angles.

4 cm

9 cm

Area = length × width
Area = 36 cm^2

3 cm

12 cm

Area = length × width
Area = 36 cm^2

When you construct a square with an area of 36 cm^2, you need to make sure that the following statements are true:

- You choose a length and width that are equal and multiply to 36.
- Your shape has two pairs of parallel sides.
- The sides meet at 90° angles.

The only possibility is 6 cm × 6 cm.

6 cm

6 cm

Area = length × width
Area = 36 cm^2

Although it's possible to make a square with any area, squares with some areas, such as 40 cm^2, will have side lengths that are not whole numbers. Students in Grade 6 have not yet been formally introduced to the skills they would need to construct these.

Constructing a Triangle With a Given Area

When you construct a triangle with an area of 36 cm², you need to make sure that you choose a base and a height that multiply to 2 × 36, or 72 (because the area of a triangle is half of the product of the base and the height).

3 cm

24 cm

Area = base × height ÷ 2
Area = 36 cm²

8 cm

9 cm

Area = base × height ÷ 2
Area = 36 cm²
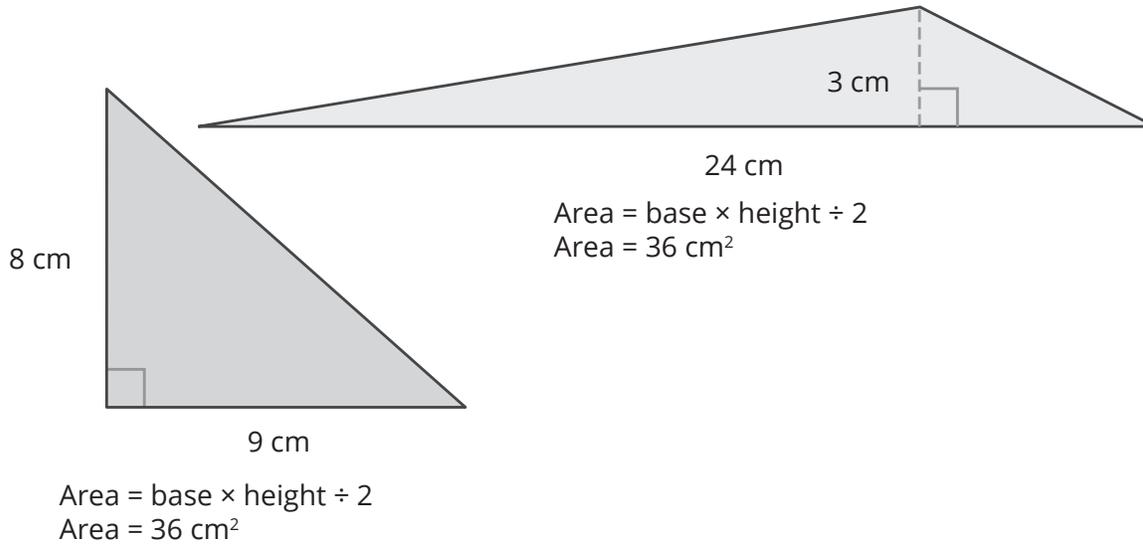
Definitions

area: the amount of space in a 2-D shape; the number of 2-D units that cover a space; for example, a rectangle that is 2 units by 3 units has an area of 6 square units

parallelogram: a quadrilateral that has two pairs of parallel and equal sides

property: an attribute that is shared by all shapes of a certain type; for example, one property of squares is having four equal sides

rectangle: a parallelogram with four right angles

square: a rectangle with four equal sides