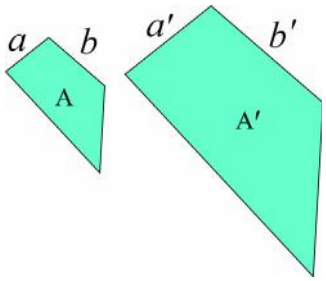
Scaling Figures

Two figures are **similar** if they have the same shape. Similar figures may be of different sizes. For example, all circles are similar, and so are all squares.

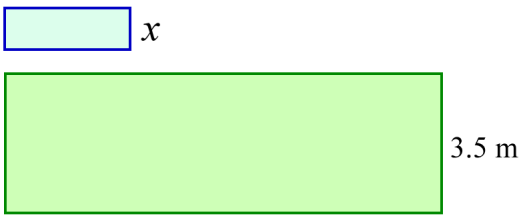


Example 1. The quadrilaterals A and A′ (read: "A prime") at the right are similar: they have the same basic shape, but one is larger.

Compare the corresponding sides: a to a' and b to b'. In the case of polygons, similarity means that **corresponding sides are proportional** (in the same ratio) and corresponding angles are equal.

So the ratio $a : a'$ is equal to the ratio $b : b'$. This ratio is called the **similarity ratio**.

Example 2. The similarity ratio between the two rectangles is 2:7. Find the length of the side marked x.



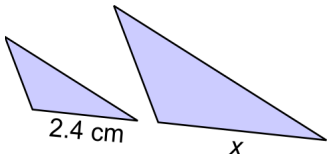
Solution 1. The lengths of the corresponding sides are in the ratio of 2:7. The unknown length of the side x corresponds to the 2 parts of the ratio and the known 3.5 m side corresponds to the 7 parts. So each part is 3.5 m ÷ 7 = 0.5 m. The unknown length is 2 · 0.5 m = 1 m.

That makes sense, since we would expect the side marked with x to be quite a bit shorter than 3.5 m.

Solution 2. We write the ratio of the lengths of the corresponding sides and set that ratio to be 2/7. We get an equation involving two equal ratios—a proportion. Its solution is on the right.

$$\frac{x}{3.5\text{ m}} = \frac{2}{7}$$
$$7x = 2 \cdot 3.5\text{ m}$$
$$7x = 7\text{ m}$$
$$x = 1\text{ m}$$

1. The figures are similar. Find the length of the side labeled x.



a. Similarity ratio 3:5.

b. Similarity ratio 7:3.