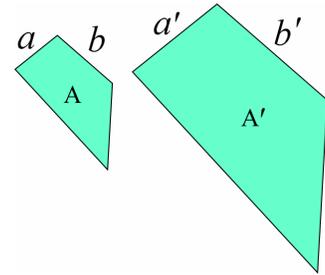


Scaling Figures

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.

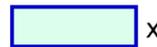
Example 1. The quadrilaterals A and A' (read: "A prime") at the right are similar: they have the same basic shape, but one is larger.



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 $3.5 \text{ m} \div 7 = 0.5 \text{ m}$. The unknown length is $2 \cdot 0.5 \text{ m} = 1 \text{ m}$.

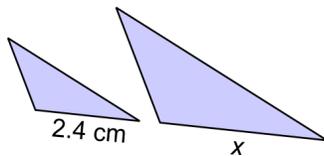


That makes sense, since we would expect the side marked with x to be quite a bit shorter than 3.5 m.

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.

$$\begin{aligned} \frac{x}{3.5 \text{ m}} &= \frac{2}{7} \\ 7x &= 2 \cdot 3.5 \text{ m} \\ 7x &= 7 \text{ m} \\ x &= 1 \text{ m} \end{aligned}$$

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



a. Similarity ratio 3:5.



b. Similarity ratio 7:3.