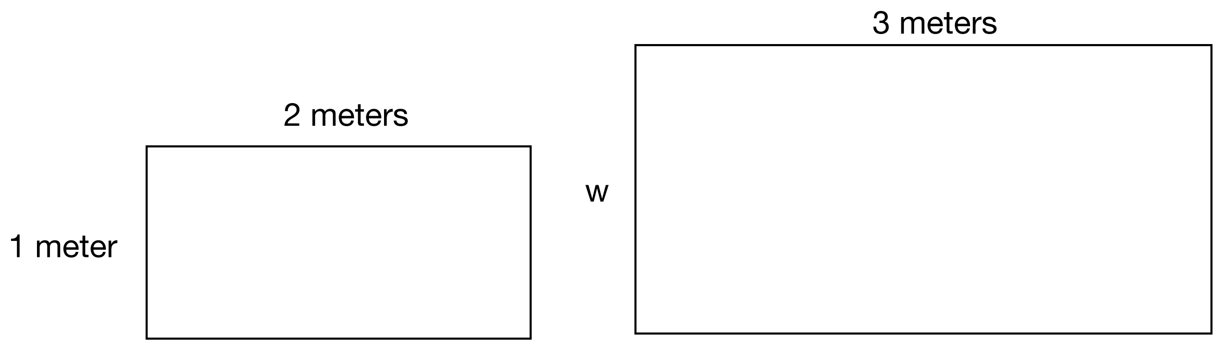
Similarity: Using Proportions

Use What You've Learned
Answers and Explanations

1. The following 2 rectangles are similar. Find the missing width by looking at the relationship between the length of the first rectangle and the length of the second rectangle.

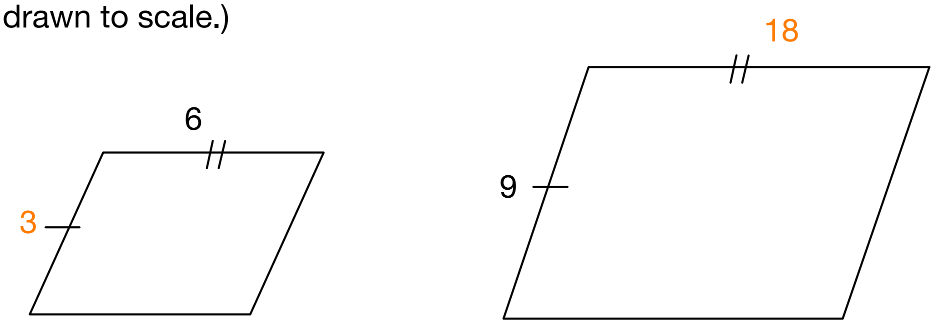


The length of the second rectangle is 1½ times the length of the first rectangle (1½ x 2 = 3). Since the rectangles are similar, the width of the second rectangle must be 1½ times the width of the first rectangle, making the width of the second rectangle equal 1½ meters (1½ x 1 = 1½).

2. Solve the above problem by looking at the relationship between the width of the first rectangle, 1 meter, and the length, 2 meters. Use this relationship to determine the width of the second rectangle.

The width of the first rectangle is half the length. Since the rectangles are similar, the width of the second rectangle must be half the length also, making it 3/2, or 1½ meters.

3. The following two parallelograms are similar and have a scale factor of three. Fill in the missing side lengths. Hash marks identify corresponding sides. (Note: the parallelograms are not drawn to scale.)



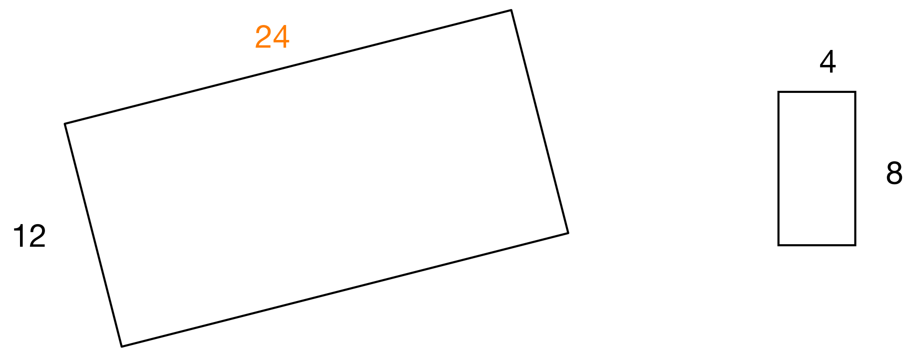
Since the scale factor is 3, the longer side of the second parallelogram is 3 x 6, or 18 units. The shorter side of the first parallelogram is 9 ÷ 3, or 3 units.

MakingSense

Show how to solve this problem using another method.

Since the scale factor is 3, the longer side of the second parallelogram is 3 x 6, or 18. The ratio of the shorter side to the longer side of the second parallelogram is 1:2, so the ratio of the shorter side to the longer side of the first parallelogram must also be 1:2. This means that the shorter side of the first parallelogram must be half the longer side, or 3.

4. The following rectangles have a scale factor of $\frac{1}{3}$. Fill in the missing side length.



Since the rectangles have a scale factor of 1/3, the length of the second rectangle must be 1/3 the length of the first rectangle. This means the length of the first rectangle must be 8 x 3, or 24.

5. Ben has two different sizes of photos of his family in front of the White House. One photo is 5" by 7" and the other photo is 8" by 10". Are the photos similar? Explain your reasoning.

Explanation 1: The ratio between the width and length of the first photo is 5:7. The ratio between the width and length of the second photo is 8:10, or 4:5. The ratios of the two photos are not the same, so the photos are not similar. One way to show the ratios are not equivalent is to write each ratio as an equivalent ratio with a common denominator. Note that 25/35 is not equal to 28/35, so the ratios are not equal.

$$\frac{5}{7} = \frac{25}{35} \qquad \frac{4}{5} = \frac{28}{35}$$

Explanation 2: The ratio of the two photos' widths is 5:8, and the ratio of the lengths is 7:10. These ratios are not the same, so the photos are not similar. One way to show the ratios are not equivalent is to write each ratio as an equivalent ratio with a common denominator. Note that 50/80 is not equal to 56/80, so the ratios are not equal.

$$\frac{5}{8} = \frac{50}{80} \qquad \frac{7}{10} = \frac{56}{80}$$