Rectangle B: $\frac{6}{10} = 0.6$
Rectangle C: $\frac{9}{15} = 0.6$
Rectangle D: $\frac{6}{20} = 0.3$

b. The ratio of the length of the long side to the length of the short side is the same for all three similar rectangles. The rectangle that is not similar to the others has a different ratio.

3. Possible answers: The scale factor from Rectangle B to Rectangle A is 2. The scale factor from Rectangle B to Rectangle C is 1.5. The scale factor from Rectangle C to Rectangle A is $\frac{4}{3}$. The scale factor tells you how many times as great each side length and the perimeter are for one of the two similar figures as compared to the other.

4. If figures are similar, their scale factor will be constant, and their ratios of corresponding side lengths will be equivalent. The scale factor gives the amount of stretching (or shrinking) from the original figure to the image. The ratio of adjacent side lengths within a figure gives an indication of the shape of the original figure (and image), since it compares measures within one figure. The ratios are usually different from the scale factor.

B. 1. Parallelograms F and G are similar, because their angles have the same measure and the ratios of adjacent sides within each figure are equivalent.

2. Parallelogram E: $\frac{10}{8} = 1.25$
   Parallelogram F: $\frac{7.5}{6} = 1.25$
   Parallelogram G: $\frac{6}{4.8} = 1.25$
   All the ratios are equivalent.

C. 1. Yes. Because you know that the adjacent sides in one rectangle have an equivalent ratio to the adjacent sides in the other rectangle, you know that the rectangles are related by a constant scale factor. You already know that corresponding angles are congruent because all angles in rectangles measure 90°.

2. No. You need to also check the corresponding angle measures to see if they are congruent. As seen above, E, F, and G have the same side-length ratio, but only Parallelograms F and G are similar.
Corresponding ACE Answers

Applications

1. a. Rectangles A and B are similar because the ratio of 2 to 4 (short side to long side) is equal to the ratio of 3 to 6 (short side to long side). Also, the scale factor is constant: 1.5.
Parallelograms D and F are similar because the ratio of 2.75 to 3.5 (short side to long side) is equal to the ratio of 5.5 to 7 (short side to long side), and the corresponding angles are the same measure. Also, the scale factor is constant: 2.

b. Answers may vary. Sample answers:
Rectangle A: \( \frac{2}{4} = 0.5 \); Rectangle B: \( \frac{3}{6} = 0.5 \)
Parallelogram D: \( \frac{2.75}{3.5} \approx 0.786 \)
Parallelogram F: \( \frac{5.5}{7} \approx 0.786 \)
The ratios for A and B are equivalent; also, the ratios for D and F are equivalent.

c. The scale factor from A to B is 1.5. The scale factor from D to F is 2. Each of these scale factors is different from the ratios found in part (b).
The scale factor compares a side in one figure to its corresponding side in a similar figure. The scale factor has to be constant from one shape to the other for any pair of corresponding sides. The ratio of adjacent side lengths describes the relationship between two measures within one shape. The ratio in one shape has to be equivalent to the ratio of corresponding sides in the similar shape.

2. a. Answers will vary. Possible answer:
b. Answers will vary. For the sketch above, the smaller rectangle’s ratio is 3 to 2; the larger rectangle’s ratio is 7.5 to 5.

Note: This assumes that the length is the longer dimension. The answer varies depending on the dimensions of the rectangles drawn.

c. Answers will vary. Possible answer for the sketch above is drawn here. The scale factors from this rectangle to the rectangles in part (a) are $\frac{1}{2}$ and $1 \frac{3}{4}$.

d. Answers will vary. Ratios of length to width are equivalent in all similar rectangles, so the answer should be equivalent to the answer for part (b).

e. The length-to-width ratios of the three rectangles are equivalent. If you were to sketch another rectangle similar to the first three, the length-to-width ratio of that rectangle would be equivalent as well. Since there is a common scale factor for all corresponding side lengths, both parts of the length-to-width ratio would grow by the same amount. This would make the new ratio equivalent to the previous three.

Extensions

41. a. The drawings will vary; however, all triangles with the given angles will be similar to each other.

b. The drawings will vary; however, all triangles with the given angles will be similar to each other.