2. Answers may vary. Students will most likely find a quadrilateral with a scale factor of either 3 or 4. If the answer is 4, the side lengths of the new rep-tile are four times the corresponding side lengths of the original.

Also, the side lengths of the new rep-tiles in Question C are twice the corresponding side lengths of the rep-tiles found during Question A. The reptiles from Question A had side lengths that were twice the lengths of the corresponding sides of the original figure. Therefore, the scale factor is \(2 \times 2\) or 4.

3. A side length of the large rectangle is the scale factor times the corresponding side length of the small rectangle. The perimeter of the large rectangle is the scale factor times the perimeter of the small rectangle. The corresponding angles of all similar figures are congruent, no matter what the scale factor is. The area of the large rectangle is the square of the scale factor times the area of the small rectangle.

**Corresponding ACE Answers**

**Applications**

1.  
   a. No, they are not similar. One of the small figures is a square, so it does not have the same shape as the original rectangle, which is not a square.

   b. Yes, they are similar because their corresponding interior angles are congruent. Also, each side of the smaller quadrilateral increases by the same scale factor to form the larger quadrilateral. The side lengths of the larger shape are double that of the smaller shape, so the scale factor is 2.

   c. Yes, they are similar because their corresponding interior angles are congruent. Also, each side of the smaller quadrilateral increases by the same scale factor to form the larger quadrilateral. The side lengths of the larger shape are triple that of the smaller shape. The scale factor is 3.

   d. Yes, they are similar because their corresponding interior angles are congruent. Also, each side of the smaller quadrilateral increases by the same scale factor to form the larger quadrilateral. The side lengths of the larger shape are double that of the smaller one, so the scale factor is 2.

2.  
   a. The area of the large rectangle is 9 times the area of the small rectangle.

   **Note:** You might suggest that students provide a sketch to verify their answer.
3. a. The area of each small rectangle is $\frac{1}{25}$ the area of the large rectangle. 
   Note: You might suggest that students provide a sketch to verify their answer.
   
b. $\frac{1}{5}$

**Connections**

29. a. $a = 120^\circ, b = 60^\circ, c = 60^\circ, d = 120^\circ, e = 60^\circ, f = 120^\circ, g = 60^\circ$

   b. Students may list any combination of angles as long as the pairs sum to $180^\circ$. Reference the answers in part (a). For example, angles $a$ and $b$, $a$ and $c$, and $a$ and $e$ are all pairs of supplementary angles.

30. a. $20^\circ$
   
b. $90^\circ$
   
c. $180^\circ - x$

31. a. 6 m; Since the scale factor from the smaller triangle to the larger triangle is 2, side $RS$ is $3 \times 2$ or 6 m.

   b. 10 m; 10 m = 5 m × 2

   c. $50^\circ; 90^\circ - 40^\circ = 50^\circ$

   d. $50^\circ; Since the sum of the angles in triangle $STR$ is $180^\circ$, and two angles are known ($80^\circ$ and angle $y$, which is $50^\circ$), we know that angle $R$ must be $180^\circ - (80^\circ + 50^\circ) = 50^\circ$ because the triangles are similar, angle $C$ is also $50^\circ$, since it corresponds to angle $R$.

   e. Angles $R$ and $Q$ are complementary, and angles $C$ and $B$ are complementary.

32. Students may have a couple of ways of solving these problems. Below is one possible solution for part (d). Similar thinking can apply to all parts.
   The scale factor that takes 8 to 2 is $\frac{1}{4}$.
   Therefore, you need $\frac{1}{4}$ of 12, which is 3.

   a. 6
   
b. 20
   
c. 8
   
d. 3
e. 60
f. 15

**Extensions**

43.

44. A sample drawing is below. The first, second, and fifth figures are shown.
a. another square

b. Answers will vary depending on how large a square they drew.

c. Answers will vary, but each square should have $\frac{1}{2}$ the area of the square before it.

d. At each step, the area of the new square is $\frac{1}{2}$ the area of the previous square.

e. All the squares are similar to each other. Also, all the triangles are similar to each other.

ACE Answers: Inv. 3 Stretching and Shrinking