Corresponding ACE Answers

Applications

4. a. The small triangles are similar to the large triangle because the corresponding angles of the triangles are congruent. The scale factor is 2.

b. The small triangles on the left and right corners are similar to the large triangle with scale factor 2, but the other two small triangles are not similar to the large triangle. Since the nonsimilar triangles are not formed by the connection of midpoints, we cannot assume that the triangles are similar.

c. None of the small triangles is similar to the large one.

d. The small triangles are similar to the large triangle since the angles in each small triangle are congruent to the angles in the large triangle. The scale factor is 2. (Note: You can compare this figure with the figure from part (a). They look different, but their constructions are essentially the same.)

5. Answers will vary.

Rectangle E:

a. Any rectangle with dimensions $6k$ by $12k$, where $k$ is any positive number, is similar to Rectangle E. The ratio of the corresponding sides will be the same.

b. The scale factor from Rectangle E to the new rectangle is $k$. The side lengths and perimeter of the new rectangle are $k$ times the corresponding lengths and perimeter of Rectangle E. The area of the new rectangle is $k^2$ times the area of Rectangle E.

Rectangle F:

a. Any rectangle with dimensions $4k$ by $10k$, where $k$ is any positive number, is similar to Rectangle F. The ratio of the corresponding sides will be the same.

b. The scale factor from Rectangle F to the new rectangle is $k$. The side lengths
and perimeter of the new rectangle are $k$ times the corresponding lengths and perimeter of Rectangle F. The area of the new rectangle is $k^2$ times the area of Rectangle F.

**Rectangle G:**

a. Any rectangle with dimensions $6k$ by $4k$, where $k$ is any positive number, is similar to Rectangle G. The ratio of the corresponding sides will be the same.

b. The scale factor from Rectangle G to the new rectangle is $k$. The side lengths and perimeter of the new rectangle are $k$ times the corresponding lengths and perimeter of Rectangle G. The area of the new rectangle is $k^2$ times the area of Rectangle G.

**Connections**

33.  
   a. 2  
   b. 0.5  
   c. 1.5  
   d. 1.25  
   e. 0.75  
   f. 0.25  

34.  
   a. 0.4, 40%  
   b. 0.75, 75%  
   c. 0.3, 30%  
   d. 0.25, 25%  
   e. 0.7, 70%  
   f. 0.35, 35%
g. 0.8, 80%

h. 0.875, 87.5%

i. 0.75, 75%

j. 0.6, 60%

35.  a. The birds are not similar since the ratio of base length of the larger figure to the base length of the smaller figure is not the same as the ratio of the height of the larger figure to the height of the smaller figure. Another possible answer is: The width of the first figure is reduced more than half while the height is reduced only about 80%. Because the two reduction scales are different, the figures are not similar.

b. The figures are similar because the ratio of base length of the larger figure to the base length of the smaller figure is the same as the ratio of the height of the larger figure to the height of the smaller figure. Another possible answer is: For both width and height, the same reduction scale is applied, so the figures are similar. The scale factor is about 0.7.

c. The figures are not similar because the height of the first figure is reduced by about 56%, while the width is reduced by a smaller percent.

d. The lighthouses are not similar because the height is enlarged but the width is reduced.

36. True. The corresponding angles will always be equal to each other since they are all 90°, and the ratio of any two sides of a square is 1. Alternatively, students might notice that if they choose any side of one square and any side of the other square, the scale factor must be the same, regardless of which sides they chose.

37. False. While the angles of any two rectangles will be the same (90°), it is not the case that the ratios of the sides will be equal.

38. True. The fact that there is a consistent scale factor implies that the shapes are similar, and so the corresponding angle measures are equal. The fact that the scale factor is 1 means that the side lengths are unchanged. Equal angle measures and equal side lengths yield congruent figures.

**Extensions**

45. a. Another equilateral triangle is formed. A sample drawing is below. The first,