

**Chapter 10** **Area and Perimeter**

**10.1 Area of Similar Figures**

Two figures are similar if they have the same shape but not necessarily the same size. For example, a small square and a larger square are similar. The ratio of their corresponding sides is called the **scale factor**.

If two figures are similar with a scale factor of  $k$ , then the ratio of their areas is  $k^2$ . For example, if a square has side length 2 and another square has side length 4, the scale factor is 2. The area of the larger square is  $4^2 = 16$ , which is  $2^2 = 4$  times the area of the smaller square ( $2^2 = 4$ ).

**Example 1** Find the area of the larger square if the smaller square has an area of 9.

**Solution:** The scale factor is 2. The area of the larger square is  $9 \times 2^2 = 36$ .

**10.2 Area of Similar Solids**

Two solids are similar if they have the same shape but not necessarily the same size. For example, a small cube and a larger cube are similar. The ratio of their corresponding sides is called the **scale factor**.

If two solids are similar with a scale factor of  $k$ , then the ratio of their volumes is  $k^3$ . For example, if a cube has side length 2 and another cube has side length 4, the scale factor is 2. The volume of the larger cube is  $4^3 = 64$ , which is  $2^3 = 8$  times the volume of the smaller cube ( $2^3 = 8$ ).

**Example 2** Find the volume of the larger cube if the smaller cube has a volume of 8.

**Solution:** The scale factor is 2. The volume of the larger cube is  $8 \times 2^3 = 64$ .

**Problem Solving** The figure shows two similar figures. Find the area of the larger figure.

**Solution:** The scale factor is 2. The area of the larger figure is  $3 \times 4 \times 2^2 = 48$ .