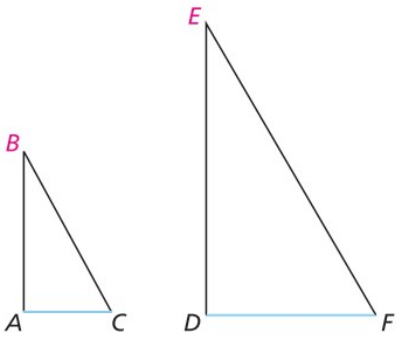
1.2 Scaling Up and Down

Corresponding Sides and Angles

In the last Problem, you worked with images, or scale drawings, that were similar to the original. Those scale drawings were larger than the original figure. In this Problem, you will work with scale drawings that are smaller than the original. You will also learn more about what it means for figures to be *similar*.

When you study similar figures, you often compare their sides and angles. To compare the parts correctly, mathematicians use the terms **corresponding sides** and **corresponding angles.** In every pair of similar figures, each side of one figure has a corresponding side in the other figure. Also, each angle has a corresponding angle.



Corresponding angles

B and E
A and D
C and F

Corresponding sides

AC and DF
AB and DE
BC and EF

Recall that there are two ways to identify angles.

You can identify an angle with three letters. The angles in the small triangle on the previous page have the following names:

Angle BAC	or	$\angle BAC$
Angle BCA	or	$\angle BCA$
Angle ABC	or	$\angle ABC$

Notice that the letter identifying the vertex of an angle is always the middle letter in its name. For example, point A is the vertex of $\angle BAC$.

You can also name an angle by its vertex. It is important to use this method only when it is clear which angle you are referring to.

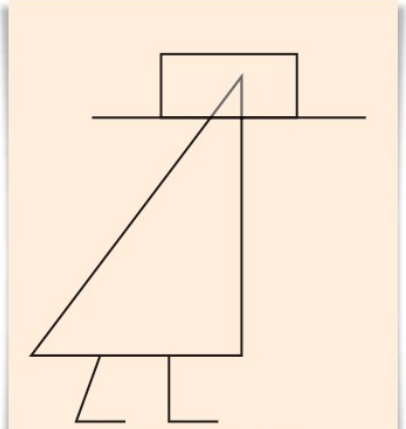
$\angle BAC$	can also be called	$\angle A$
$\angle BCA$	can also be called	$\angle C$
$\angle ABC$	can also be called	$\angle B$

- What names would you give the angles of the large triangle?

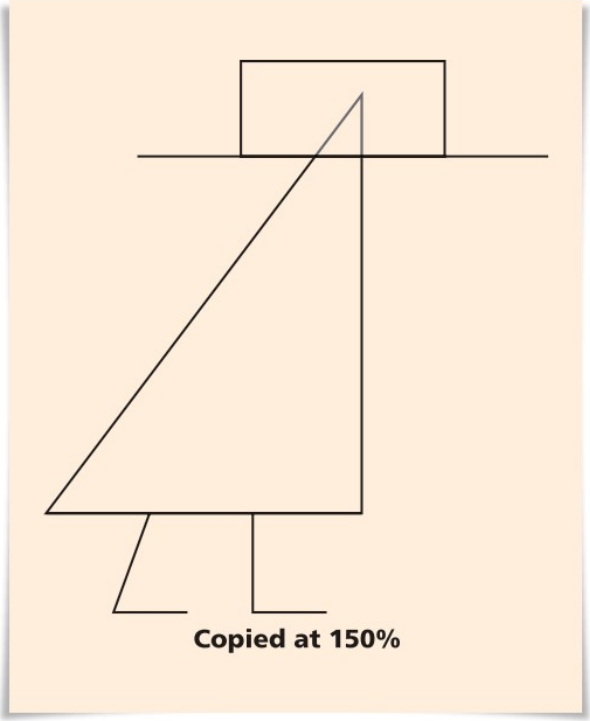
Did You Know?

Measurement is often used in police work. For example, some stores with cameras place a spot on the wall 6 feet from the floor. When a person standing near the wall is filmed, this makes it easier to estimate the person's height. Investigators take measurements of tire marks at the scene of auto accidents to help them estimate the speed of the vehicles involved. Photographs and molds of footprints help the police determine the shoe size, type of shoe, and weight of the person who made the prints.

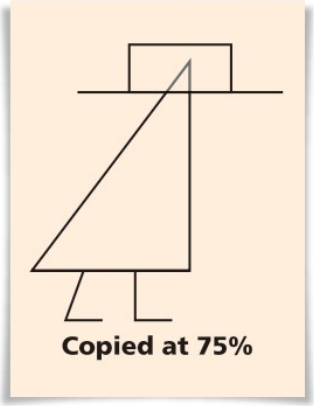
Daphne thinks the rubber-band method is clever, but she believes the school copier can make more accurate copies in a greater variety of sizes. She makes a copy of "Super Sleuth" with the size factor set at 75%. Then, she makes a copy with a setting of 150%. The results are shown below.



Original drawing



Copied at 150%



Copied at 75%

- How are these copies of the original logo like the copy you made with the rubber-band stretchers? How are these copies different from the rubber-band stretcher copy?
- How are these copies like the original? How are they different?

Problem 1.2

A Use the figures on the previous page. For each copy of Super Sleuth, do the following:

1. Describe how the side lengths compare to the corresponding side lengths in the original figure.
2. Describe how the angle measures compare to the corresponding angle measures in the original figure.
3. Describe how the perimeter of the triangle in each copy compares to the perimeter of the triangle in the original figure.
4. Describe how the area of the triangle in each copy compares to the area of the triangle in the original figure.

B How do the relationships in the size comparisons you made in Question A relate to the copier size factors used?

C

1. If two figures are similar, what is the same about the figures and what is different?
2. If you wanted to achieve a 150% increase with the rubber-band method, what would you do?

ACE Homework starts on page 16.