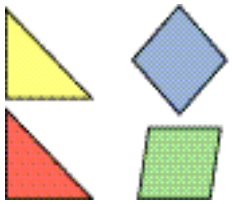
7.5 Congruence and Similarity

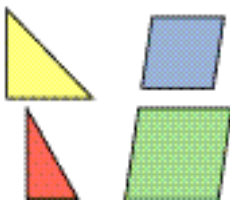
You will need
- a ruler
- a protractor

GOAL
Investigate the conditions that make two shapes congruent or similar.

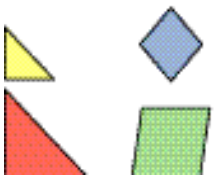
Explore the Math



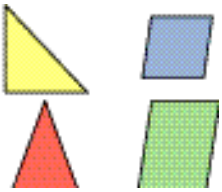
These pairs of shapes are congruent.



These are not.



These pairs of shapes are similar.



These are not.

? What information do you need to know if you want to construct congruent and similar shapes?

A. Look at the diagrams of congruent shapes. Explain what you think "congruent" means.

B. Look at the diagrams of similar shapes. Explain what you think "similar" means.

C. For each group of triangles described in the chart, construct as many triangles as you can that fit the description.

Group of triangles	How are the triangles the same?	How are the triangles different?	Are the triangles congruent?	Are the triangles similar?
equilateral triangles with sides that are 4 cm				
triangles with sides that are 3 cm, 6 cm, and 4 cm				
isosceles triangles with an angle of 40° between two equal sides of 2 cm each				
isosceles triangles with equal sides that are 4 cm long				
right triangles with one side that is 4 cm long				
triangles with angles of 30°, 80°, and 70°				
triangles with a 5 cm side between angles of 60° and 70°				
triangles with a base of 3 cm and a height of 4 cm				

D. Draw an irregular quadrilateral (with unequal sides). Describe the quadrilateral in terms of its sides and angles. Test your description by having someone follow it to draw the same shape.

Reflecting

1. Look at your chart for step C.

a) Choose a group with triangles that are congruent. Why do you think they are congruent?

b) Choose a group with triangles that are not congruent. What other information would you need to give so that the triangles for this group would be congruent?

2. Suppose that you have two hexagonal paving tiles that you think might be congruent, but they are too heavy for you to move. What tools would you need to check whether the tiles are congruent? How would you use these tools?

3. a) How can you tell when two shapes are congruent?

b) How can you tell when two shapes are similar?

c) Is it easier to tell whether two shapes are congruent or whether they are similar? Explain.

4. Read each statement about the relationship between congruence and similarity. Decide whether the statement is true or false, and use examples to explain why.

a) All similar geometric figures are also congruent.

b) Congruent geometric figures are not always similar.