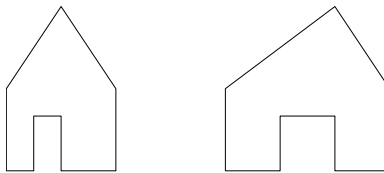We saw that two shapes were _____ if they are

If two objects are _____, but they are not necessarily
_____, we say they are _____.

This means that objects are _____ one is a _____
of the other.
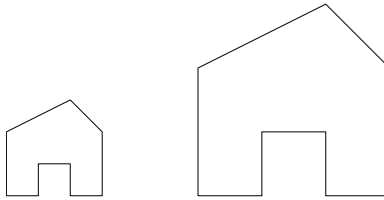
Caution: Students might think that "similar" means _____. This is the
_____ definition, but not the mathematical definition. For example, they
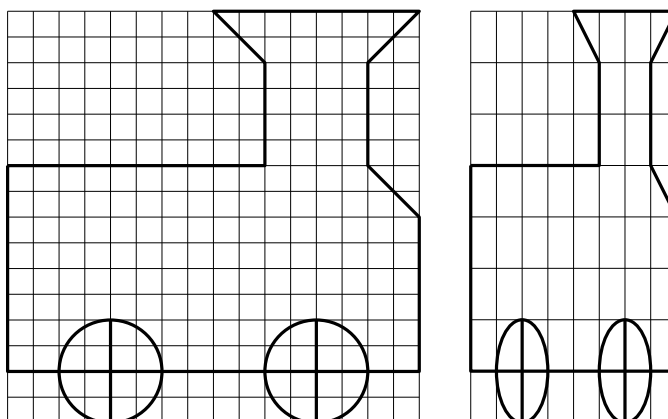might think the following shapes are similar because

More formally, we say that two objects are _____ if _____
on one object _____ to _____ on the second object, and
there is some number k such that the _____ between _____
on the first object is _____ the _____
_____.

This number k is called the _____.

For example:
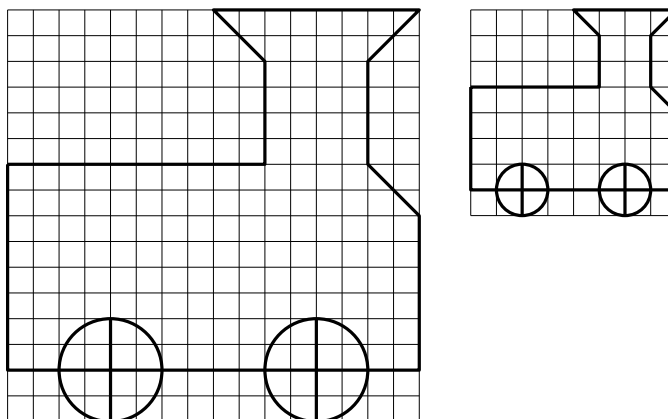
On the other hand:

Problems Involving Similarity

We have _____ methods for solving problems involving similarity. Consider the following problem:

Problem: An architect builds a scale model of the building he has been commissioned to design to show his clients. The scale model is 16 inches wide and 10 inches tall. If the actual building is going to be 200 feet (2400 inches) wide, how tall will the building be?

Method 1: _____

Since the scale model and actual building are _____, we know that there is a _____ so that every distance on the actual building is _____ the corresponding distance on the scale model. Therefore, the width of the actual building is

and the height of the actual building is

But we also know that

so

Method 2: _____

Since the scale model is _____ and _____, it is _____ times _____.

The actual building should be _____ times _____

_____ also because

Therefore, it should be

Method 3: _____

We can calculate the _____ both as

and

Therefore,

So if we let h stand for the height of the building, we get

This tells us that

Testing for Similarity Two shapes might look like they are similar when they are not. We need ways of testing to be sure.

Method 1: _____

A _____ is a transformation of the plane that transforms shapes into _____. A dilation _____ and with _____ is the transformation that takes each _____ A to the point A' that lies on the _____ from _____ through _____ and whose distance from P is _____ the distance between A and P.
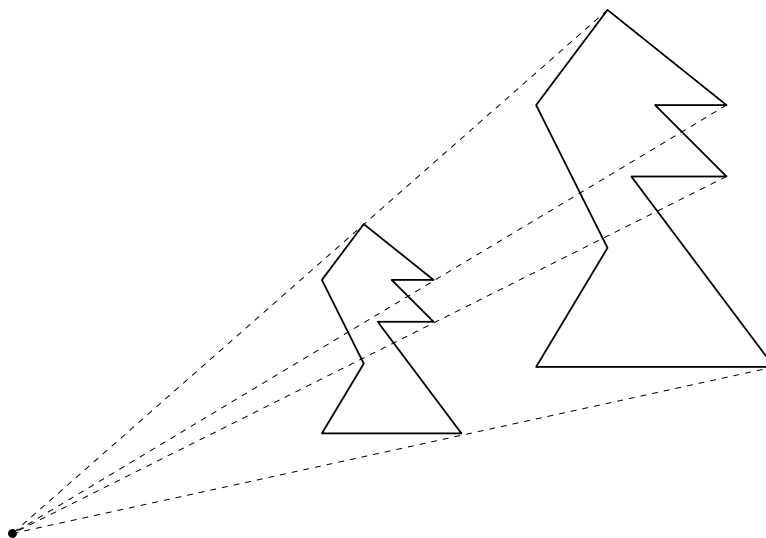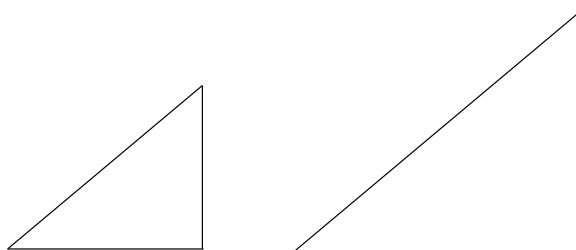
Dilations scale _____ distance in the plane by the _____ (not just distances between points and P). Therefore, two shapes are similar if one is _____ _____ a dilation of the other.
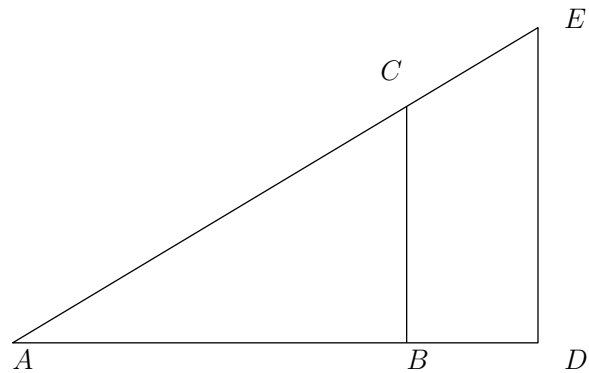
An important property of dilations: Dilations _____.

Method 2: _____ Criterion for _____ Similarity

Two triangles are _____ exactly when the two triangles have _____.

Example: Use similarity to find the length of DE.

Applications to Distances

We can use the idea of similarity to help us estimate distances.

Method 1: _____

Hold your thumb out in front of you with your arm _____.
Close _____ and compare the height of your thumb with an
_____. Say your thumb is _____
tall, the object in the distance is _____ tall, and your arm is _____
long. Can you tell how far away the object is?

Method 2: Finding Heights using _____

Suppose you go outside and hold a yardstick perpendicular to the ground, and it casts a 2-foot shadow. Can you use this information to measure the height of a flagpole if you can see its entire shadow?

Additional information needed:

Then, using the fact that the sun's rays are essentially parallel when they reach the earth, we know that the _____ of the sun's rays with the top of the yardstick is _____ as

Suppose we measure the flagpole's shadow to be 14 feet long.