Lesson 4.01
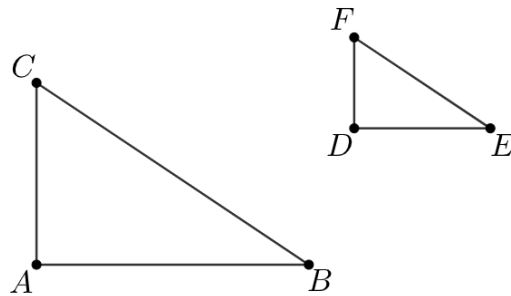# Angles & Slope

Geometry GT
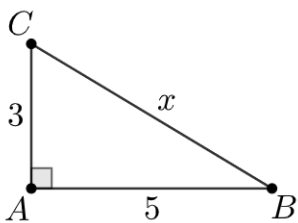
Recall
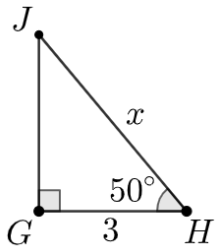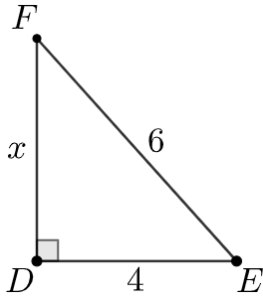
Triangle ΔABC is similar to triangle ΔDEF. Write as many equations as you can to describe the relationships between the sides and angles of the two triangles.

Explore

For each triangle, find the value of x. If there is not enough information, what else do you need to know?

F

x 6

D   4   E

J

x

50°

G   3   H

Discuss

Some buildings offer ramps in addition to stairs so people in wheelchairs have access to the building. What characteristics make a ramp safe?

A school has 4 steps to the front door, and each step is 7 inches tall. Design a ramp for the school that meets the following ADA guidelines, as ramps are required for any change in level greater than half an inch:

- Ramps have a maximum slope of 1:12 (4.8 degrees)

- Ramps have a minimum width of 36 inches

- There must be a minimum 5 feet by 5 feet flat area at the top and bottom of the ramp for turning

- Ramps may be no longer than 30 feet horizontally between flat rest or turn platforms

Demonstrate

A ramp with a length to height ratio of 12:1 forms a right triangle with a 4.8° angle.

Draw a right triangle with a base of 60mm and a height of 5mm, a ratio of 12:1.

What is the angle measurement if the base is only 30mm long and the height is still 5mm tall?

When the length is half as long does that make the angle half as big?

What is the angle measurement if the base is 30mm long and the height is increased to 10mm tall?

When the height is twice as tall does that make the angle twice as big? Test it by increasing the height to 20mm tall.

Practice

1. The Americans with Disabilities Act states that ramps must have an angle of elevation less than or equal to 4.8°. Design 2 ramps that meet the ADA requirements.

2. Find the missing side in each triangle using any method. Check your answers using a different method.
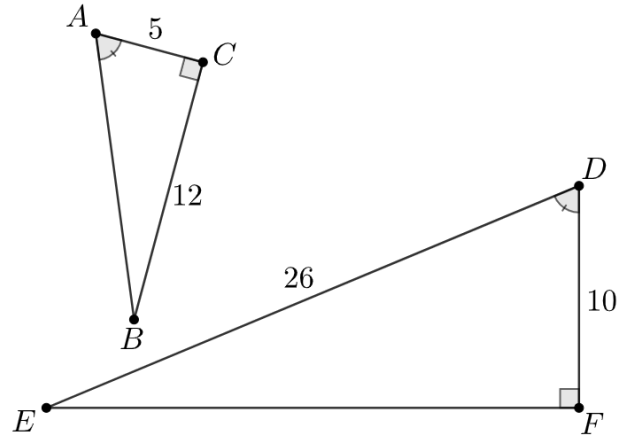
3. In the diagram, $\overleftrightarrow{AC} \parallel \overleftrightarrow{DE}$, and $\overleftrightarrow{CD}$ is perpendicular to each of those lines. If $BD = \frac{4}{3}$, calculate the length of $\overline{DE}$.