Similar Triangles

Objective:

Determine whether two triangles are similar

Understand and use SAS, AA, and SSS

Similar Triangles

- Triangles are SIMILAR if they have the same shape but can be different sizes (can also be rotated or reflected). The symbol for similarity is ~

PROPERTIES

- Correspond angles are congruent (same measure)
- Corresponding sides are all in the same proportion (k)

Side-Angle-Side (SAS)

- The **Side-Angle-Side (SAS) Similarity Statement** asserts that if the measures of two sides of a triangle are proportional to the measures of two corresponding sides of another triangle and the included angles are congruent, then the triangles are similar.

Side-Angle-Side (SAS)

$\triangle ABC \backsim \triangle DEF$ If $\angle B \cong \angle E$ and $\dfrac{AB}{DE} = \dfrac{BC}{EF}$
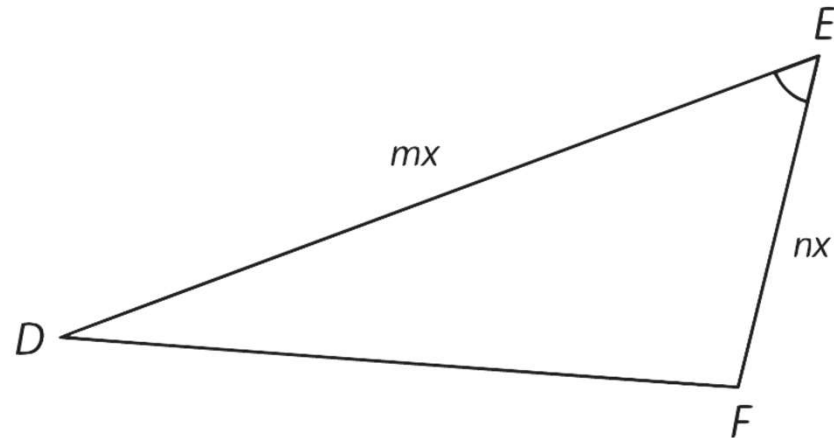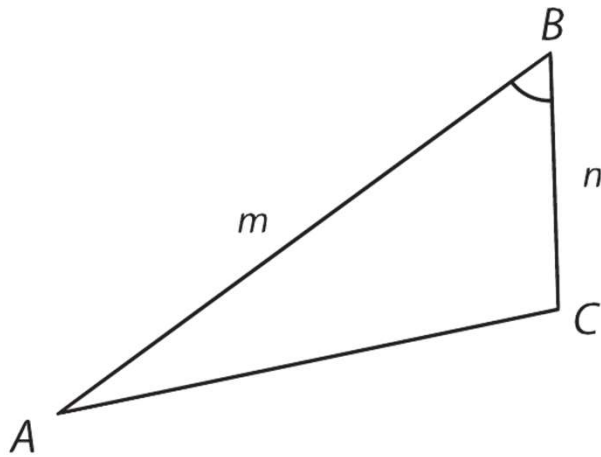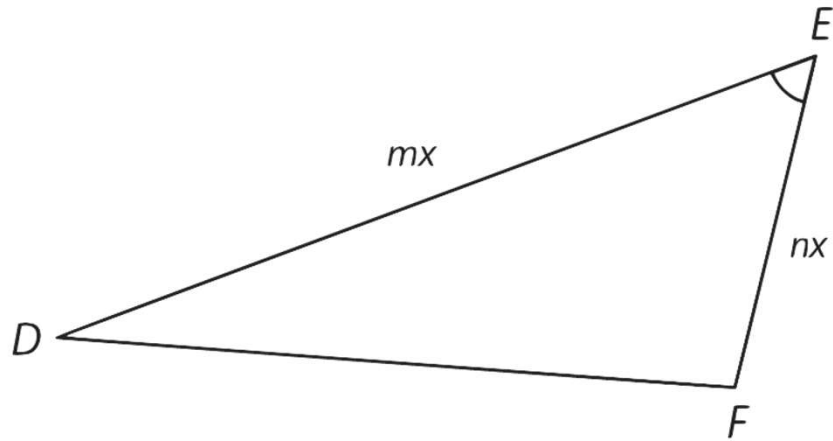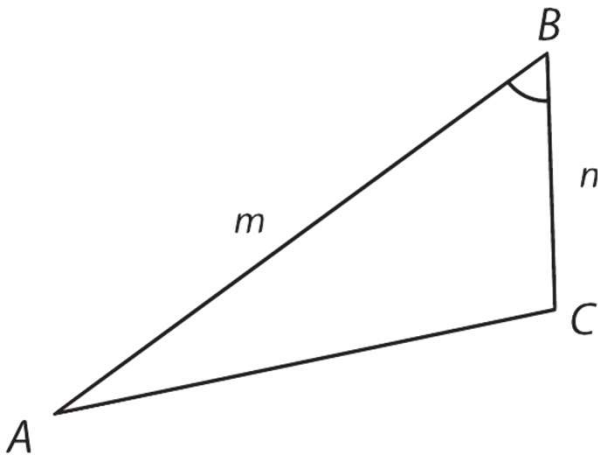

CAUTION!! The most common mistake made when using SAS is to use an angle that is NOT BETWEEN the two sides.

Side-Side-Side (SSS)

The Side-Side-Side (SSS) Similarity Statement asserts that if the measures of the corresponding sides of two triangles are proportional, then the triangles are similar.

Side-Side-Side (SSS)

$$\triangle ABC \backsim \triangle DEF \quad \text{If} \quad \frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$$
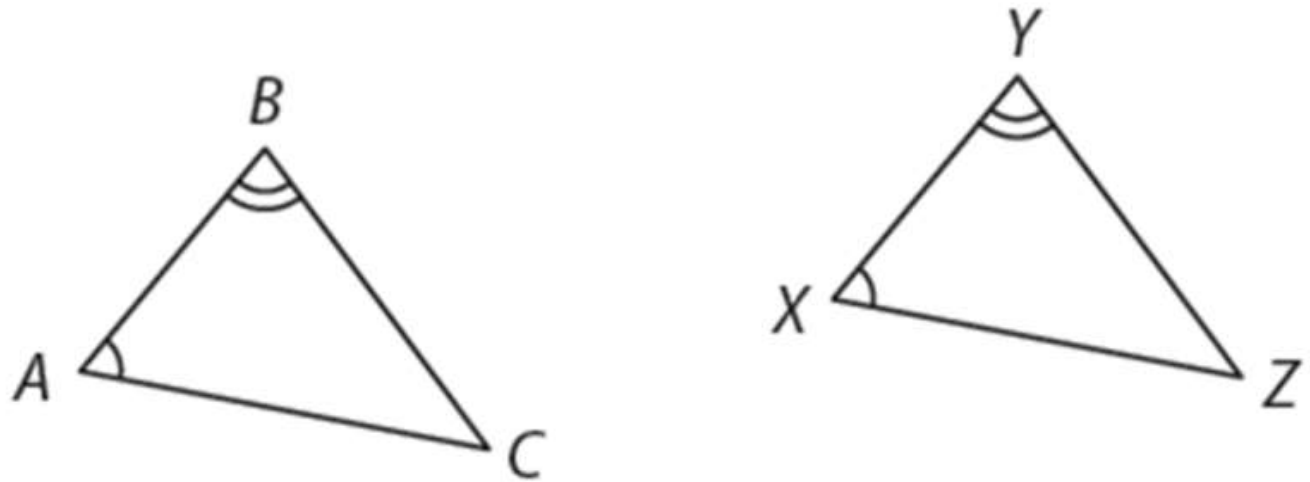
Angle-Angle (AA)

The Angle-Angle (AA) Similarity Statement
asserts that if the measures of two angles of two triangles are congruent (equal), then the triangles are similar.
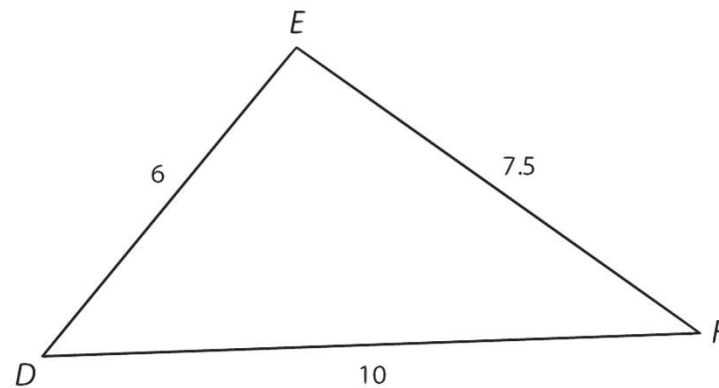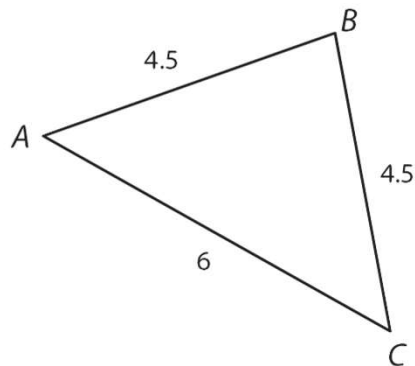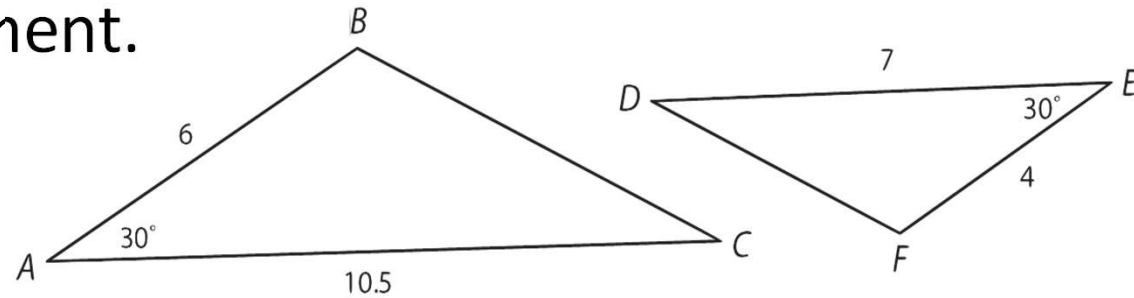
Angle-Angle (AA)

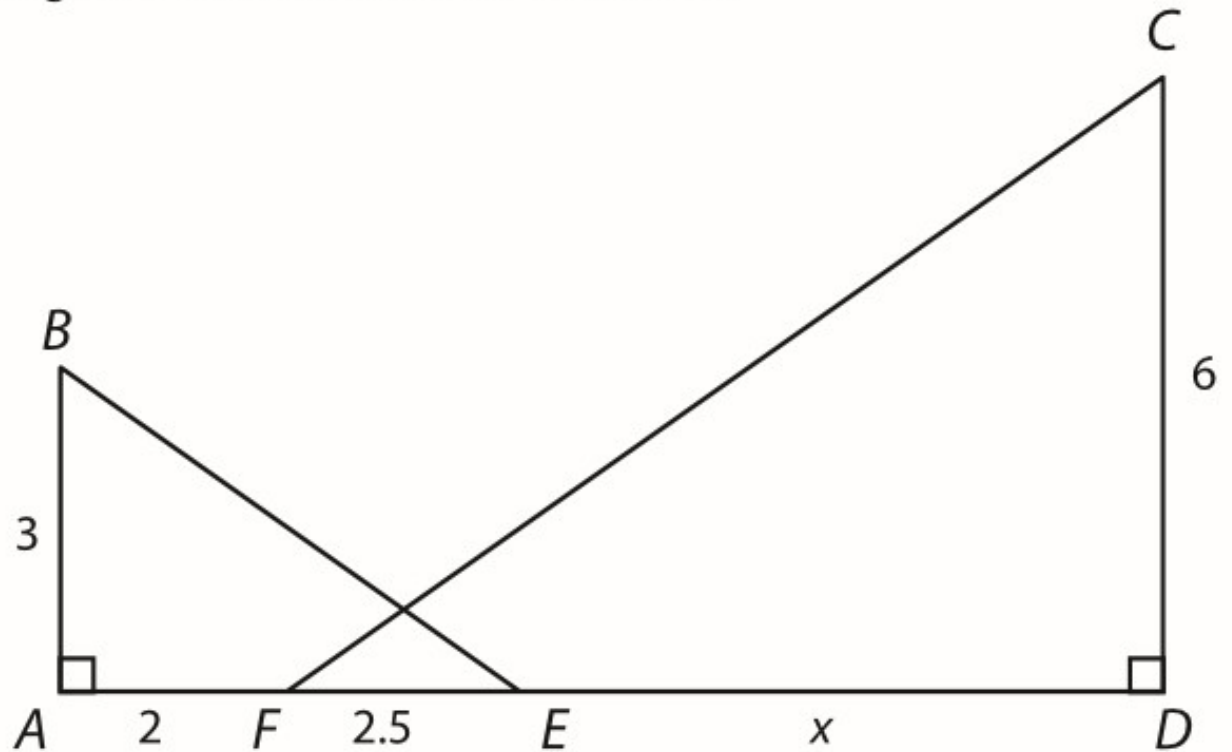$\triangle ABC \sim \triangle XYZ$

Examples 1 and 2

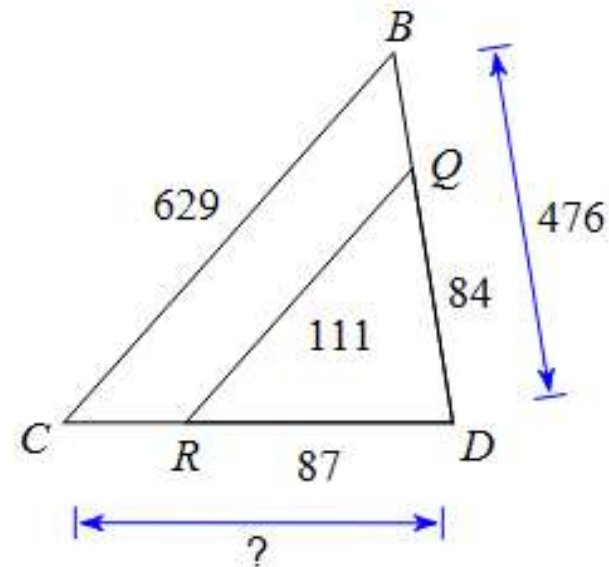- Determine whether the triangles are similar. Write a similarity statment.
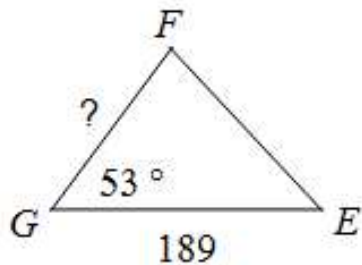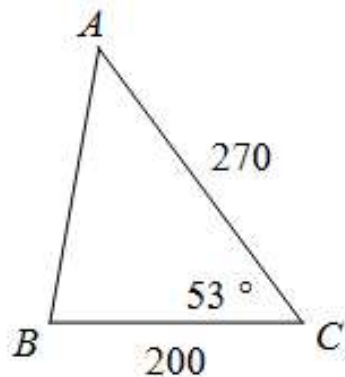
Example 4

Identify the similar triangles and then find the value of x.

Hint: unstack the triangles

AA, SSS, SAS Similarity

The following triangles <u>are</u> similar. Find the missing length

- Archaeologists, among others, rely on the Angle-Angle (AA), Side-Angle-Side (SAS), and Side-Side-Side (SSS) similarity statements to determine actual distances and locations created by similar triangles. Many engineers, surveyors, and designers use these statements along with other properties of similar triangles in their daily work. Having the ability to determine if two triangles are similar allows us to solve many problems where it is necessary to find segment lengths of triangles.

Similar Right Triangles

Find the distance across a canyon can often be difficult. A drawing of similar triangles can be used to make this task easier. Use the diagram to determine $\overline{AR}$, the distance across the

R

x

A   180 m   B   90 m   C

75 m

D
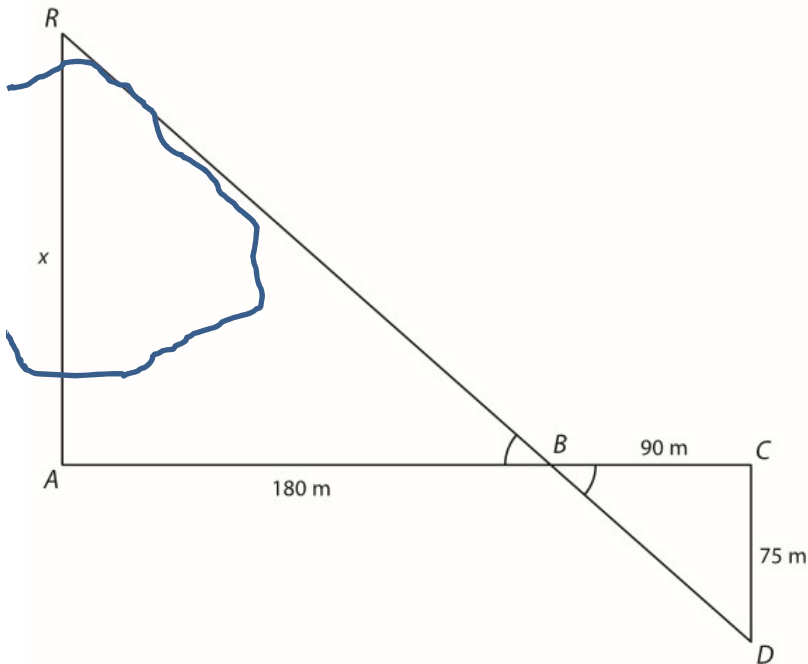
Similar Right Triangles

A meter stick casts a shadow 65 centimeters long. At the same time, a tree casts a shadows 2.6 meters long. How tall is the tree?

When solving proportions we often end up with Quadratic Equations that we need to solve!

Solve: $\dfrac{4}{x} = \dfrac{x-6}{x-4}$

Solve: $\dfrac{x-1}{x+2} = \dfrac{10}{3x-2}$

Assignment:

10.3 worksheet
and
MathXL 10.3

Remember to show all your steps!