

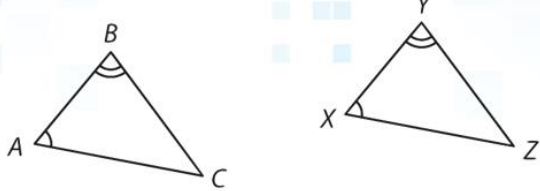
UNIT 4 LESSON 7

TRIANGLE SIMILARITIES

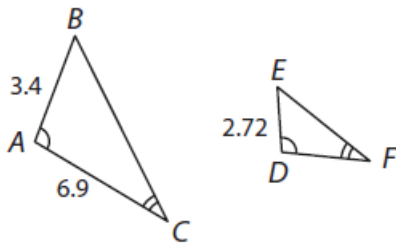
The **Angle-Angle (AA) Similarity Statement** is one statement that allows us to prove triangles are similar. The AA Similarity Statement allows that if two angles of one triangle are congruent to two angles of another triangle, then the triangles are similar.

Similar triangles have corresponding sides that are proportional.

$$\triangle ABC \sim \triangle XYZ$$



Example 1 Explain why $\triangle ABC \sim \triangle DEF$, and then find the length of \overline{DF} .



Since two angles of triangle are congruent to two angles of another triangle, the triangles are similar by the **Angle-Angle (AA) Similarity Statement**.

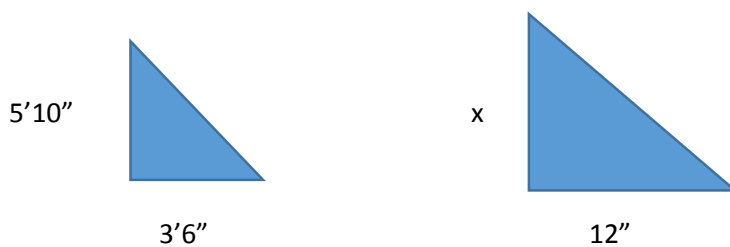
Find the length of DF: **Use Triangle Proportionality Theorem**

$$\frac{AB}{DE} = \frac{AC}{DF} = \frac{3.4}{2.72} = \frac{6.9}{x}$$

$$3.4x = 18.768, x = 5.52$$

Example 2

Suppose a person 5 feet 10 inches tall casts a shadow that is 3 feet 6 inches long. At the same time of day, a flagpole casts a shadow that is 12 feet long. To the nearest foot, how tall is the flagpole?



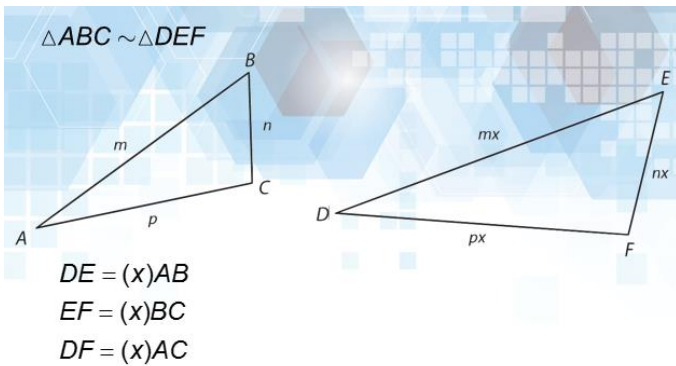
The triangles are similar by the **Angle-Angle (AA) Similarity Statement**. Find the length of the flagpole.

$$\frac{5.83}{x} = \frac{3.5}{12}$$

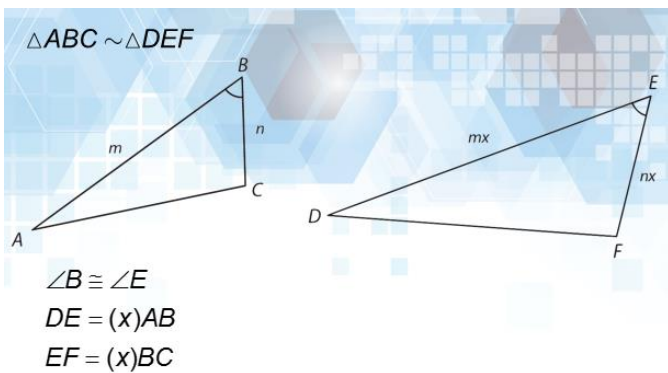
$$3.5x = 70$$

$$x = 20$$

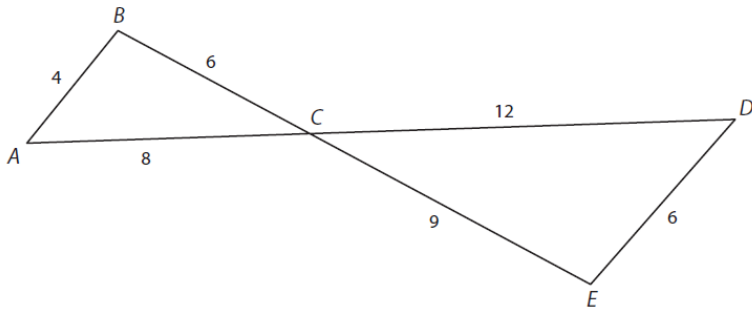
The **Side-Angle-Side (SAS) Similarity Statement** asserts that if the measures of two sides of a triangle are proportional to the measures of two corresponding sides of another triangle and the included angles are congruent, then the triangles are similar.



• 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.



Example 3 Prove $\triangle ABC \sim \triangle DEC$.



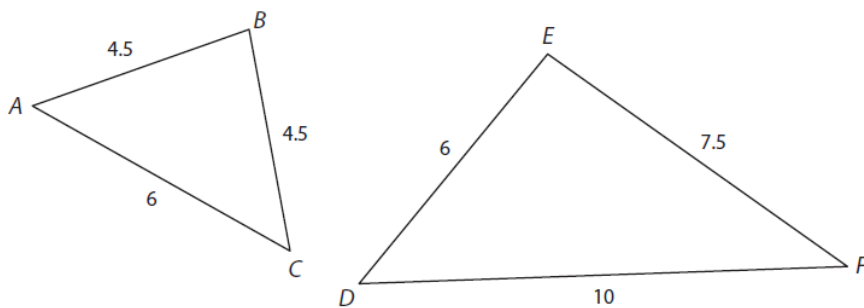
$$\frac{AB}{DE} = \frac{4}{6} = \frac{2}{3}$$

$$\frac{BC}{EC} = \frac{6}{9} = \frac{2}{3}$$

$$\frac{AC}{DC} = \frac{8}{12} = \frac{2}{3}$$

Since the measures of the corresponding sides of two triangles are proportional the triangles are similar by the **Side-Side-Side (SSS) Similarity Statement**.

Example 4 Determine whether the triangles are similar. Explain your reasoning.



$$\frac{AB}{DE} = \frac{4.5}{6} = \frac{3}{4}$$

$$\frac{BC}{EF} = \frac{4.5}{7.5} = \frac{3}{5}$$

$$\frac{AC}{DF} = \frac{6}{10} = \frac{3}{5}$$

Since the measures of the corresponding sides of two triangles are **NOT proportional** the triangles are **NOT similar** by the **Side-Side-Side (SSS) Similarity Statement**.