NOTES: SECONDARY 2 HONORS

UNIT 7: Proving Similarity

STARTER

1. Find the distance between the two points:
   a. $(3, 7)$ and $(-5, -6)$
   b. $(-1, 4)$ and $(-4, 1)$

2. The Statue of Liberty, a gift to the United States from France in 1886, stands 93 meters tall. A replica of the famous statue is 7.75 meters.
   a. What is the scale factor comparing the height of the replica to the actual height of the Statue of Liberty?
   b. The height of the base of the Statue of Liberty is approximately 46.5 meters. What is the height of the base of the Statue of Liberty Replica?

Methods for Proving Triangle Similarity:

➔ **Angle-Angle (AA) Similarity Statement**: If two _____ of one triangle are _____ to two _____ of another triangle, then the triangles are similar.

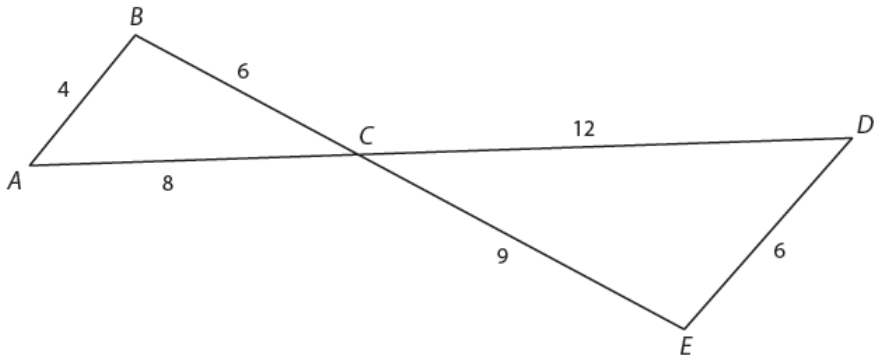
➔ **Side-Angle-Side (SAS) Similarity Statement**: If the measures of _____ of a triangle are _____ to the measures of two _____ sides of another triangle, and the included angles are _____, then the triangles are similar.

➔ **Side-Side-Side (SSS) Similarity Statement**: If the measure of the _____ sides of two triangles are _____, then the triangles are similar.

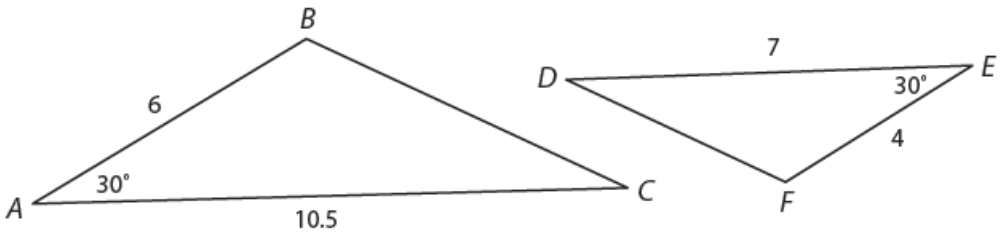
Legitimate **proofs** include the following:

- A statement of what is to be proven
- A list of the given information
- A diagram including the given information (if possible)
- Step-by-step statements to support logical reasoning

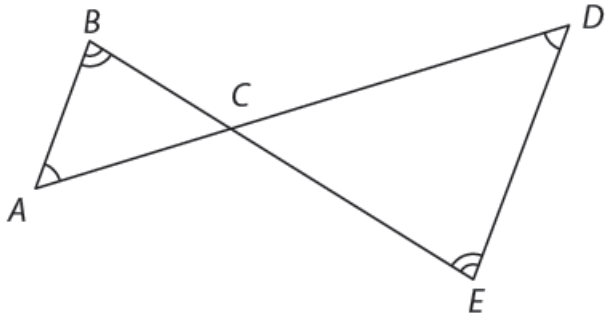
Example 1: Prove that $\Delta ABC \sim \Delta DEC$.



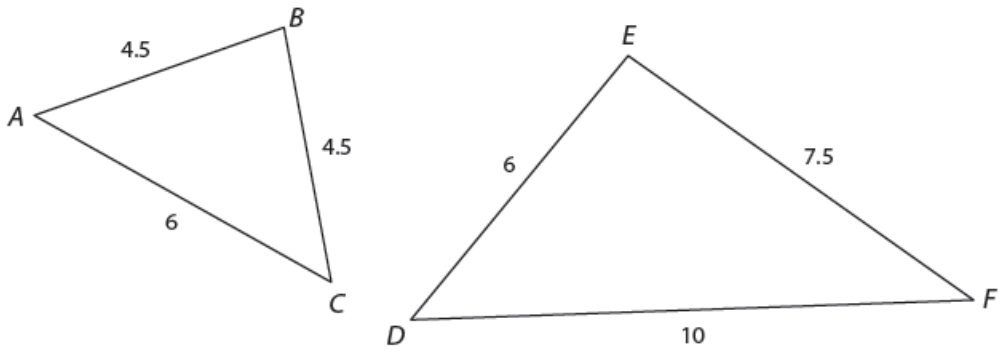
Example 2: Determine whether the following triangles are similar. Explain your reasoning logically.



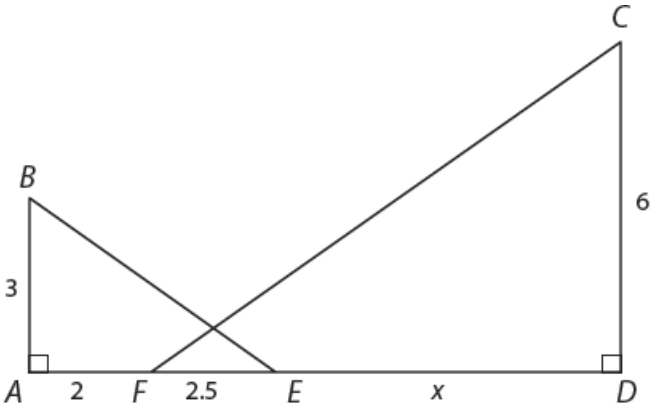
Example 3: Determine if the following diagram contains similar triangles. Explain your reasoning logically.



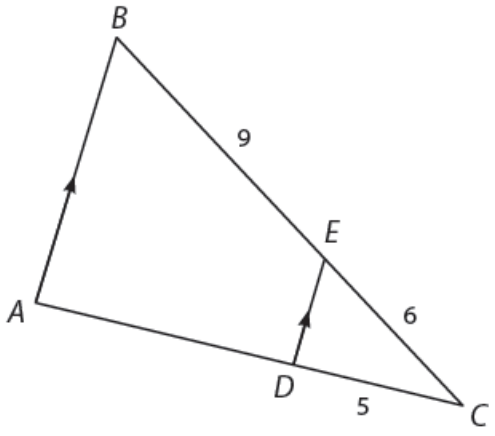
Example 4: Determine whether the triangles are similar. Explain your reasoning.



Example 5: Identify the similar triangles and then find the value of x.



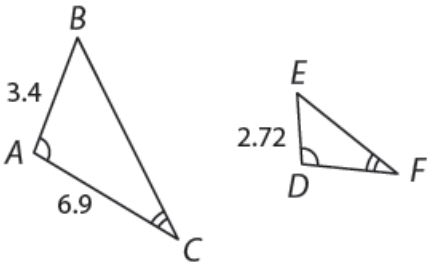
Example 6: Identify the similar triangles and prove their similarity. Then, find the length of $\overline{CA}$.



Triangle Proportionality Theorem: If a line parallel to one side of a triangle intersects the other two sides of the triangle, then the parallel line divides these two sides proportionally.

Example 7: Suppose a person who is 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?

Example 8: Explain why $\Delta ABC \sim \Delta DEF$, and then find the length of $\overline{DF}$.



Example 9: To find the distance across a pond, Rita climbs a 30-foot observation tower on the shore of the pond and locates points A and B so that $\overline{AC}$ is perpendicular to $\overline{CB}$. She finds the measure of $\overline{DB}$ to be 12 feet. What is the measure of $\overline{AD}$, the distance across the pond?