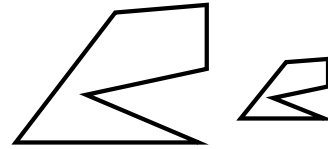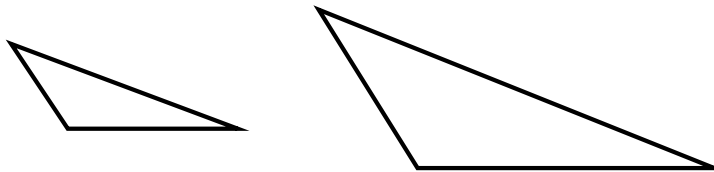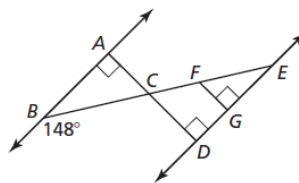# 8.3: SAS and SSS Similarity

Essential Question

What are two ways to use corresponding sides of two triangles to determine that the triangles are similar?

Warmup

Use the diagram to copy and complete the statement.

1. $\triangle ABC \sim$ _____

2. $\triangle FEG \sim$ _____

3. $m\angle ACB =$ _____

4. $m\angle FEG =$ _____

5. $m\angle ACE =$ _____

6. $AD \parallel$ _____

Explore:
1.   Open Geogebra
2.   Click on "More" tools, and use "Segment with given line" to make a segment AB with a length between 3 and 8 (decimals okay...you pick!)
3.   Click on A and make a different segment that is 2 times as long... so   AC=2(AB)
4.   Use the angle measure tool to measure <A and them move the points until it's a 35° angle.
5.   Now connect BC to make a triangle
6.   Is your triangle similar to your neighbors?

7.   To check, measure <B. Are the triangles similar?
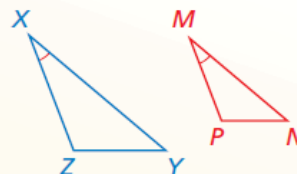
Segment with
Given Length

Measure
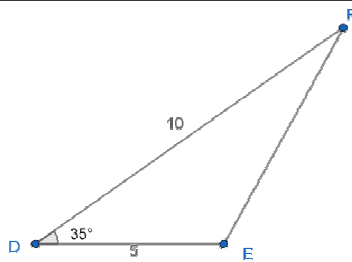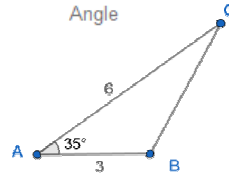
Angle

Theorem

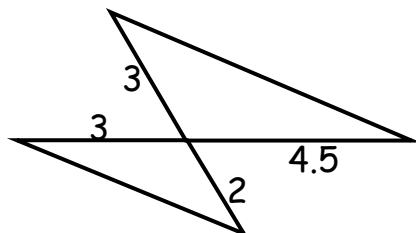**Theorem 8.5   Side-Angle-Side (SAS) Similarity Theorem**

If an angle of one triangle is congruent to an angle of a second triangle and the lengths of the sides including these angles are proportional, then the triangles are similar.

If $\angle X \cong \angle M$ and $\dfrac{ZX}{PM} = \dfrac{XY}{MN}$, then $\triangle XYZ \sim \triangle MNP$.
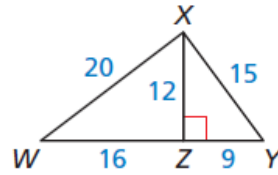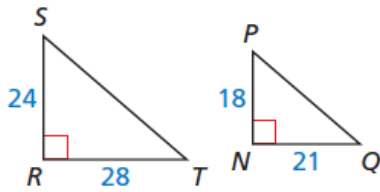
Proof Ex. 33, p. 443

Example Can you prove that the triangles are similar?

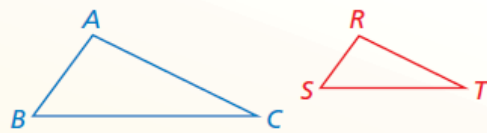**Explain how to show that the indicated triangles are similar.**

1. △SRT ~ △PNQ   **2.** △XZW ~ △YZX

S   P   X
24   18   20   15
                                                   12
R   28   T   N   21   Q   W   16   Z 9 Y

Theorem

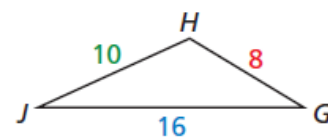**Theorem 8.4   Side-Side-Side (SSS) Similarity Theorem**

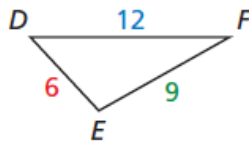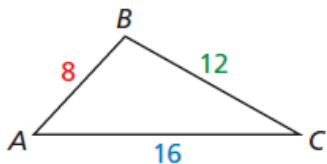If the corresponding side lengths of
two triangles are proportional, then
the triangles are similar.

A   R
                     S   T
B   C

If $\dfrac{AB}{RS} = \dfrac{BC}{ST} = \dfrac{CA}{TR}$, then △ABC ~ △RST.

Proof p. 437

Is either △DEF or △GHJ similar to △ABC?

B   D   12   F   H
8   12   6   9   10   8
A   16   C   E   J   16   G

Find the value of x that makes $\triangle ABC \sim \triangle DEF$.
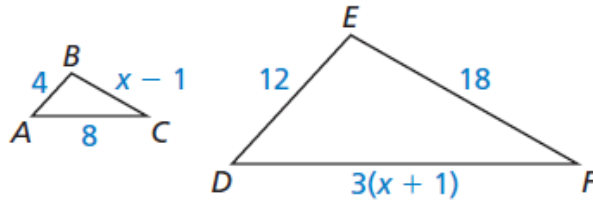
(Socrative)

Use the diagram.
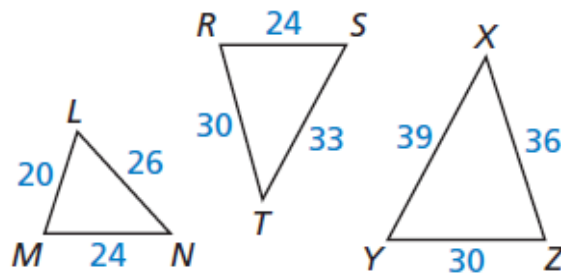
1. Which of the three triangles are similar? Write a similarity statement.

2. The shortest side of a triangle similar to $\triangle RST$ is 12 units long. Find the other side lengths of the triangle.

4