6.2 Similar Triangle Theorems

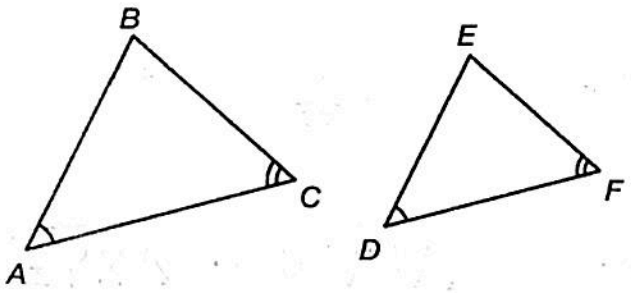
Similar Triangles: *triangles that have all pairs of corresponding angles congruent and all corresponding sides are proportional*

You can conclude that two triangles are similar if you are able to prove that all of their corresponding angles are congruent ~~and~~ or all of their corresponding sides are proportional.

Let's see how you can use fewer pairs of angles or fewer pairs of sides to show that triangles are similar.

The Angle-Angle Similarity Theorem: "If two angles of one triangle are congruent to two angles of another triangle, then the triangles are similar."

(AA)

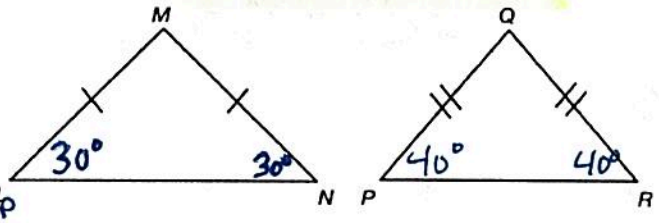


If $m\angle A = m\angle D$ and $m\angle C = m\angle F$, then $\Delta ABC \sim \Delta DEF$

Explain why this similarity theorem is Angle-Angle instead of Angle-Angle-Angle.

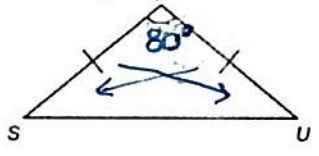
∡'s must = 180°. If two ∡'s ≅ then 3rd ∡ must also be ≅.

The triangles shown are isosceles triangles. Do you have enough information to show that the triangles are similar? Explain your reasoning. →



No we don't know relationship of corr. ∡'s.

180 − 80 = 100
100 ÷ 2 = 50°



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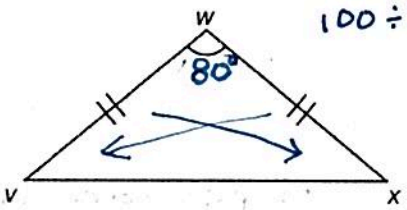


The triangles shown are isosceles triangles. Do you have enough information to show that the triangles are similar? Explain your reasoning. ←

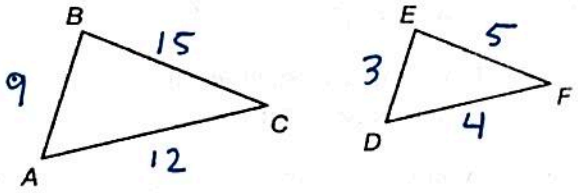
in isosceles Δ, opposite ∡'s ≅. The sum of two other ∡'s has to be same and opposite ∡'s in Δ are ≅ so ∡ corr. ∡'s in Δ's are ≅

Yes

PAP Geometry Notes (SSS)

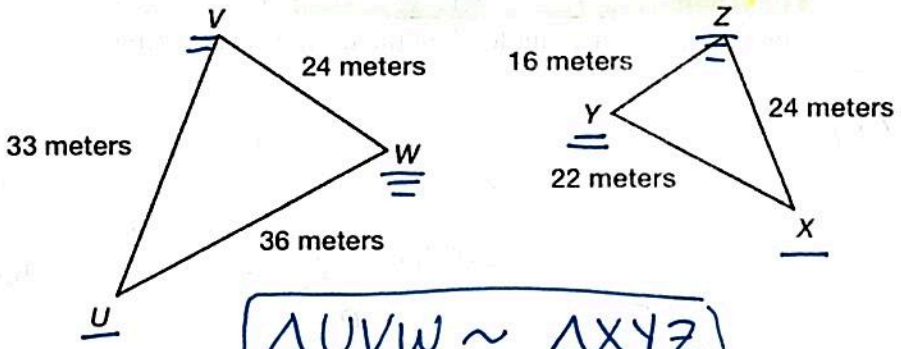
The **Side-Side-Side Similarity Theorem**: "If all three corresponding sides of two triangles are proportional, then the triangles are similar."

If $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$, then $\triangle ABC \sim \triangle DEF$.



Determine whether ΔUVW is similar to ΔXYZ.

If so, use symbols to write a similarity statement.



$\frac{33}{22} = \frac{36}{24} = \frac{24}{16}$

$1.5 = 1.5 = 1.5$ ✓

$\Delta UVW \sim \Delta XYZ$

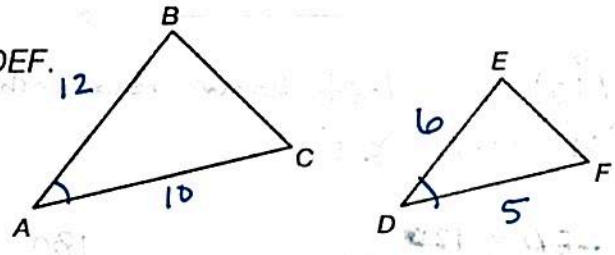
An **included angle** is an angle formed by two consecutive sides of a figure.

An **included side** is a line segment between two consecutive angles of a figure.

The **Side-Angle-Side Similarity** Theorem: "If two of the corresponding sides of two triangles are proportional and the included angles are congruent, then the triangles are similar."

(SAS)

If $\frac{AB}{DE} = \frac{AC}{DF}$ and $\angle A \cong \angle D$, then $\triangle ABC \sim \triangle DEF$.



Combinations of Sides and Angles for Similar Triangles	Combinations of Sides and Angles that Do Not Ensure Similarity
AA – two ∠'s ≅	• 1 pair corr. sides prop. (S)
SSS – all sides proportional corr.	• 2 pairs corr. sides prop. (SS)
SAS – two corr. sides proportional and included ∠s ≅	• 1 pair corr. ∠'s ≅ (A)
	• 2 pairs corr. sides prop. and a non-included ∠ (SSA)