

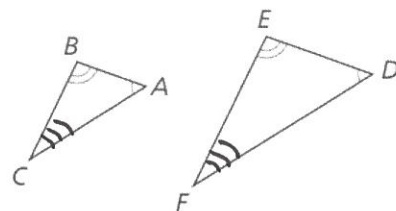
Proving Triangles Similar using Angle-Angle Similarity

Lesson Objective INBAT prove 2 Δ s are $\sim$ by AA $\sim$

In the exploration on Tuesday, we saw that two triangles are similar when only given two angle measures of the triangles. This suggests the Angle-Angle Similarity Theorem.

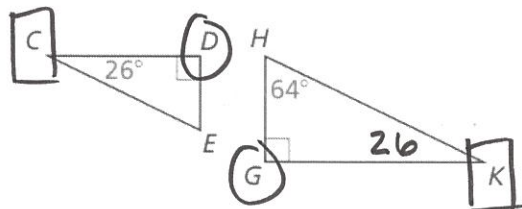
Angle-Angle Similarity Theorem (AA $\sim$)

If two angles of one triangle are congruent to two angles of another triangle, then the two triangles are similar.



Example:

- Determine whether the triangles are similar. If they are, briefly explain your reasoning. Then write a similarity statement.



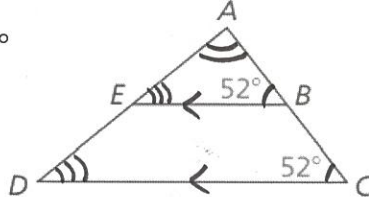
$$\triangle CDE \sim \triangle KGH$$

yes, by AA $\sim$. we have 2 corresp. $\angle$ s $\cong$ ($\angle C \cong \angle K$ and $\angle D \cong \angle G$)

- Write a two-column proof.

Given: $m\angle ABE = 52^\circ$ and $m\angle ACD = 52^\circ$

Prove: $\triangle ABE \sim \triangle ACD$



for any 2 figures, if all corresp. $\angle$ s are $\cong$, then they are similar. So, in Δ s, if we have 2 of 3 corresp. $\angle$ s $\cong$, then we get 3rd by 3rd $\angle$ s Thm. So, all corresp. $\angle$ s $\cong$, so Δ s are $\sim$

Statements

Reasons

① $m\angle ABE = 52^\circ$ and $m\angle ACD = 52^\circ$	① given
② $m\angle ABE = m\angle ACD$	② Trans. prop. =
③ $\angle ABE \cong \angle ACD$	③ $= \rightarrow \cong$
④ $\angle EAB \cong \angle DAC$	④ reflex. prop. $\cong$
⑤ $\triangle ABE \sim \triangle ACD$	⑤ AA $\sim$ (3, 4)

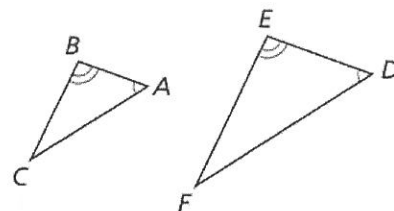
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Lesson Objective

In the exploration on Tuesday, we saw that two triangles are similar when only given two angle measures of the triangles. This suggests the Angle-Angle Similarity Theorem.

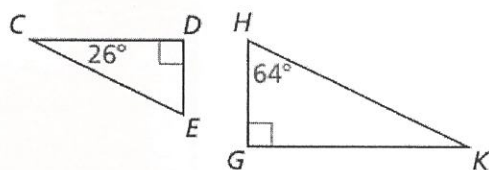
Angle-Angle Similarity Theorem ()

If two angles of one triangle are congruent to two angles of another triangle, then the two triangles are similar.



Example:

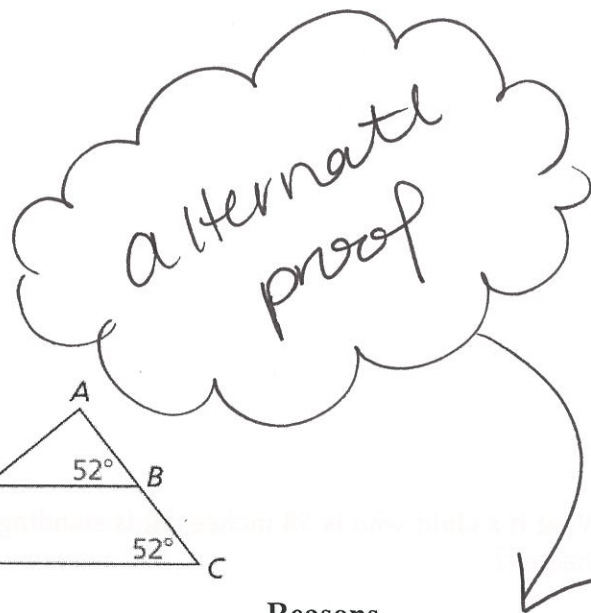
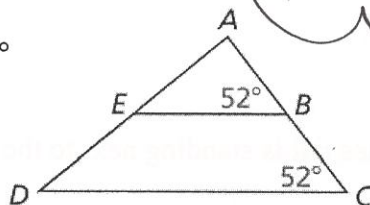
- Determine whether the triangles are similar. If they are, briefly explain your reasoning. Then write a similarity statement.



- Write a two-column proof.

Given: $m\angle ABE = 52^\circ$ and $m\angle ACD = 52^\circ$

Prove: $\triangle ABE \sim \triangle ACD$



Statements

Reasons

① $m\angle ABE = 52^\circ + m\angle ACD = 52^\circ$

① Given

② $m\angle ABE = m\angle ACD$

② Trans. prop. =

③ $\angle ABE \cong \angle ACD$

③ if $\angle$'s $\Rightarrow \angle$'s $\cong$

④ $\overline{EB} \parallel \overline{DC}$

④ if corresp. $\angle$'s $\cong \Rightarrow \parallel$

⑤ $\angle AEB \cong \angle ADC$

⑤ if $\parallel \Rightarrow$ corresp. $\angle$'s $\cong$

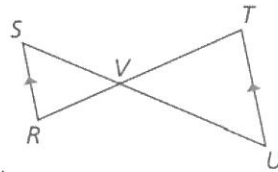
⑥ $\triangle ABE \sim \triangle ACD$

⑥ AA $\sim$ (3,5)

3. Write a two-column proof.

Given: $\overline{SR} \parallel \overline{UT}$

Prove: $\triangle SVR \sim \triangle UVT$



Statements	Reasons
① $\overline{SR} \parallel \overline{UT}$	① given
② $\angle R \cong \angle T$	② if $\parallel \rightarrow$ alt. int. $\angle s \cong$
③ $\angle SVR \cong \angle UVT$	③ vert. $\angle s \cong$
④ $\triangle SVR \sim \triangle UVT$	④ AA $\sim$ (2, 3)

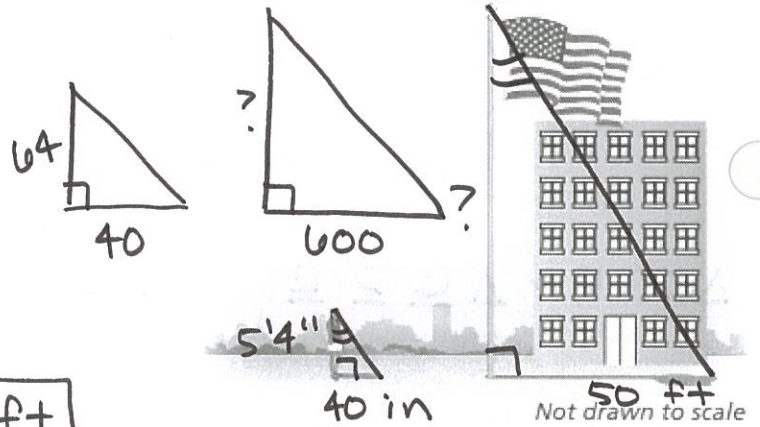
4. A flagpole casts a shadow that is 50 ft long. At the same time, a woman standing nearby who is 5 feet 4 inches tall casts a shadow that is 40 inches long. How tall is the flagpole to the nearest foot?

$$\frac{64}{40} = \frac{x}{600}$$

$$40x = 38400$$

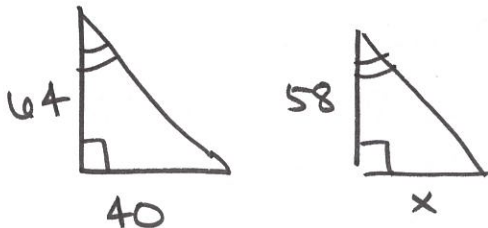
$$x = 960 \text{ in}$$

$$960 \text{ in} \times \frac{1 \text{ ft}}{12 \text{ in}} = \boxed{80 \text{ ft}}$$



$$50 \text{ ft} \times \frac{12 \text{ in}}{1 \text{ ft}} = 600 \text{ in}$$

5. What if a child who is 58 inches tall is standing next to the woman in example #4? How long is the child's shadow?

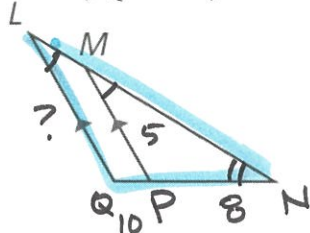


$$\frac{64}{58} = \frac{40}{x}$$

$$2320 = 64x$$

$$x = \boxed{36.25 \text{ in}}$$

6. $PN = 8$, $QP = 10$, and $MP = 5$. Find LQ .



$$\frac{5}{x} = \frac{8}{18}$$

$$8x = 90$$

$$x = 11.25$$

$$\boxed{LQ = 11.25}$$

