

# Triangle Similarity { 8.2 }

Secondary Math II Notes

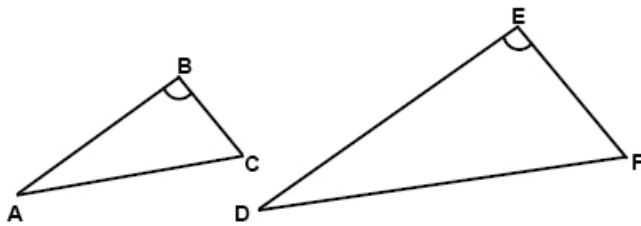
**OBJECTIVE:** Define triangle similarity and determine if two triangles are similar.

Triangle: *A polygon with three sides and three angles, a triangles angles add up to 180°*

Proportional: *having a constant ratio to another quantity*

Corresponding: *Objects that appear in the same place in two similar figures*

Similar: *resembling without being identical*



Proportional Sides:  $\overline{AB}$  &  $\overline{DE}$ ,  $\overline{AC}$  &  $\overline{DF}$ ,  $\overline{BC}$  &  $\overline{EF}$

Congruent angles:  $\angle A$  &  $\angle D$ ,  $\angle B$  &  $\angle E$ ,  $\angle C$  &  $\angle F$

The triangles are similar because their corresponding angles are **congruent** and their **corresponding** sides are proportional. One triangle is a dilation of the other because it has been multiplied by a scale factor.

Determine whether the following triangle sides are proportional.

*No sides are not proportional*

$\frac{3}{6} = \frac{1}{2}$   
 $\frac{8}{16} = \frac{1}{2}$   
 $\frac{6}{14} = \frac{3}{7}$

*Yes sides are proportional*

$\frac{10}{12} = \frac{5}{6}$   
 $\frac{15}{18} = \frac{5}{6}$   
 $\frac{20}{24} = \frac{5}{6}$

Determine whether the following triangle angles are congruent

*No angles are not congruent*

$90 + 38 = 128$   
 $180 - 128 = 52$

$90 + 47 = 137$   
 $180 - 137 = 43$

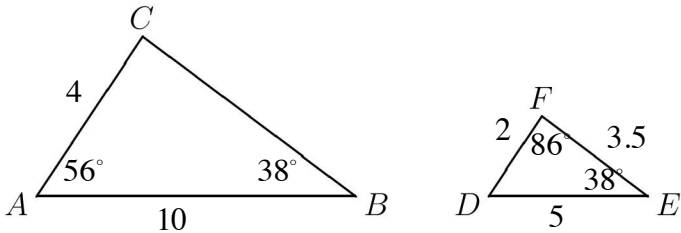
Assume  $AB \parallel DC$

*Angles are Congruent*

$\angle A \cong \angle C$  given  
 $\angle B \cong \angle D$  by alt. interior angles  
 $\angle E \cong \angle E$  by vertical angles

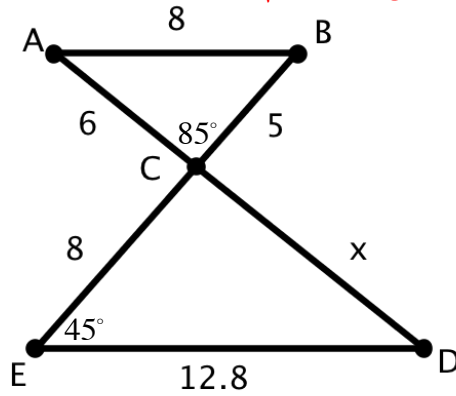
Determine whether the following triangles are similar. Label any missing sides or angles.

Yes triangles are similar

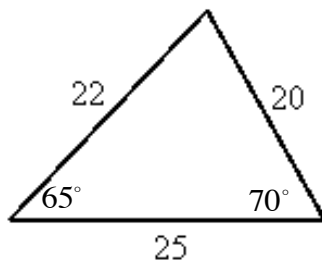
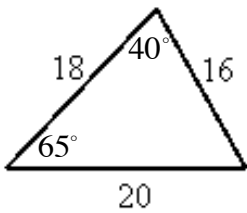


$\angle C = 56$   
 $\angle D = 56$   
 $\overline{CB} = 7$

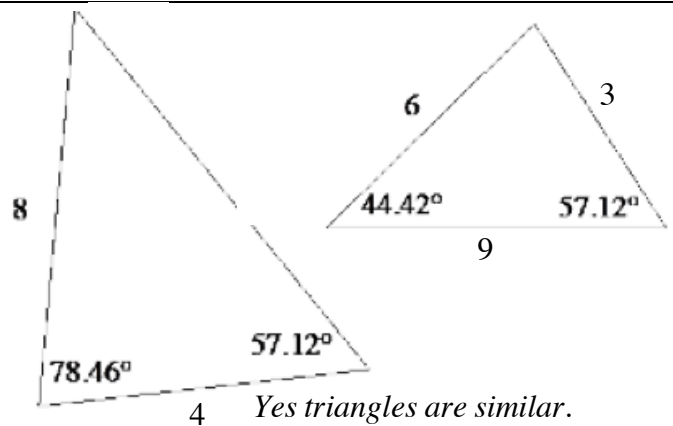
Assume  $\overline{AB} \parallel \overline{ED}$ . Yes triangles are similar



$\angle C = 85$   
 $\angle B = 45$   
 $\angle A = \angle D = 50$   
 $x = 3.75$



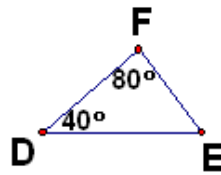
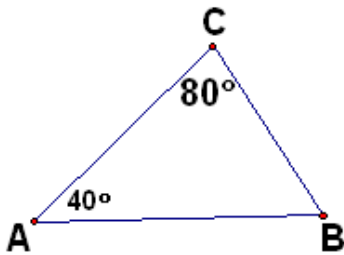
No triangles are not similar  
 Missing Angles: 75 and 45



Yes triangles are similar.  
 Missing Angles : 44.42 & 78.46  
 Missing Side : 12

**Challenge:** To show two triangles are similar, do we need to show all three sides are proportional and all three angles are congruent?

Can we determine whether or not the following triangles are similar? Explain why or why not?



**AA Similarity Theorem:** Two triangles are similar if they have two corresponding angles that are congruent or equal in measure.

