# Investigation 1: Is AA a Similarity Shortcut?

1. Draw any triangle ABC.



DE = 5.34 cm    EF = 9.70 cm

BC = 4.85 cm

AB = 2.67 cm

AC = 5.62 cm    DF = 11.25 cm

$\dfrac{AB}{DE} = 0.50$    $\dfrac{AC}{DF} = 0.50$    $\dfrac{BC}{EF} = 0.50$
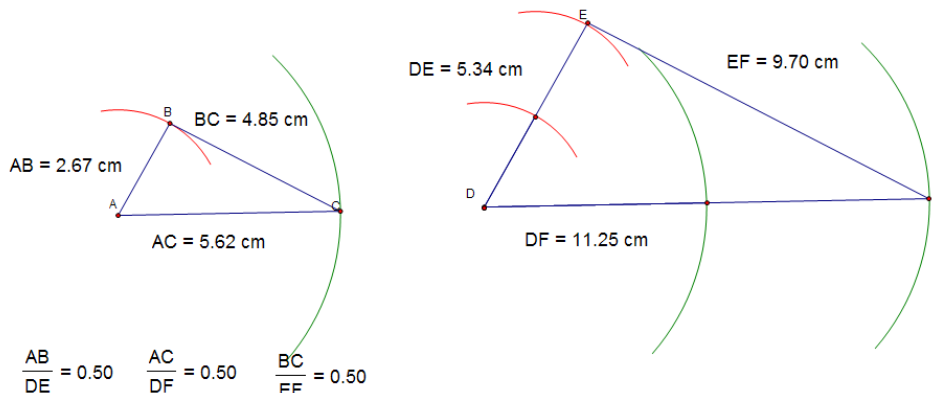
2. Construct a second triangle, DEF; with $< D \cong < A$ and $< E \cong < B$. What will be true about $< C$ and $< F?$ Why?

   Angle C and Angle F must be congruent because the three angles of each triangle must add up to 180°.

3. Carefully measure the lengths of the sides of both triangles. Compare the ratios of the corresponding sides. Is $\dfrac{AB}{DE} \approx \dfrac{AC}{DF} \approx \dfrac{BC}{EF}$?

   The ratios should be equal.

4. Compare your results with the results of others near you. State your findings as a conjecture:

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

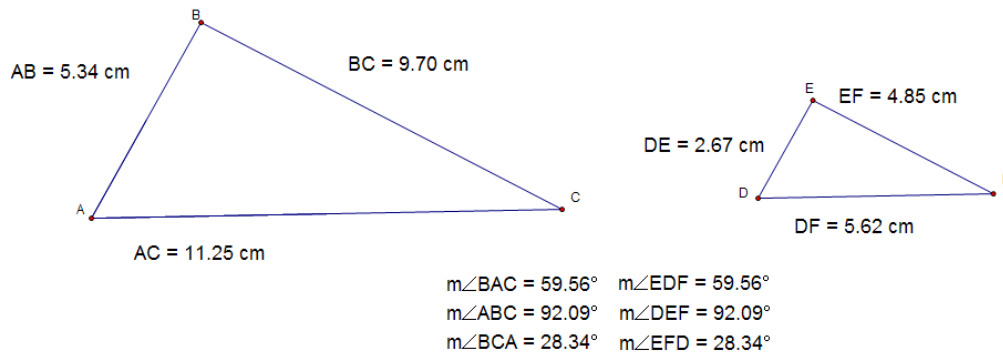5. What theorem can be used to help prove your conjecture above? Explain.

   This reviews the triangle sum theorem (see reason from #2).

6. What similarity shortcuts do we not have to investigate? Why?

   We do not have to investigate AAA, ASA, or SAA because we have shown that AA is enough to prove two triangles are congruent.

# Investigation 2: *Is SSS a similarity Shortcut?*

1. Draw any triangle ABC.



AB = 5.34 cm    BC = 9.70 cm

EF = 4.85 cm    DE = 2.67 cm

DF = 5.62 cm

AC = 11.25 cm

m∠BAC = 59.56°  m∠EDF = 59.56°
m∠ABC = 92.09°  m∠DEF = 92.09°
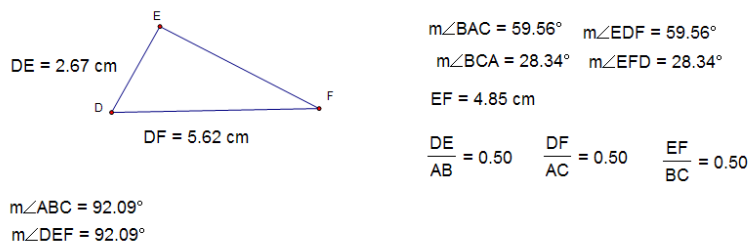m∠BCA = 28.34°  m∠EFD = 28.34°

2. Construct a second triangle, DEF, Whose side length are a multiple of the original triangle.
3. Compare the corresponding angles of the two triangles.
4. Compare your results with the results of others near you and state a conjecture.

<span style="color:red">If the three sides of one triangle are proportional to the three sides of another triangle, then the two triangles are similar.</span>

# Investigation 3: *Is SAS a Similarity Shortcut?*

1. Construct two different triangles that have two pairs of sides proportional and pair of included angles equal in measure. *(You may use ΔABC from investigation #2, just construct a new ΔDEF)*



DE = 2.67 cm

DF = 5.62 cm

m∠BAC = 59.56°  m∠EDF = 59.56°
m∠BCA = 28.34°  m∠EFD = 28.34°

EF = 4.85 cm

$\dfrac{DE}{AB} = 0.50$    $\dfrac{DF}{AC} = 0.50$    $\dfrac{EF}{BC} = 0.50$

m∠ABC = 92.09°
m∠DEF = 92.09°

2. Compare the measures of corresponding sides and corresponding angles.
3. Share your results with others near you and state a conjecture

<span style="color:red">If two sides of one triangle are proportional to two sides of another triangle and the include angles are congruent, then the triangles are similar</span>