SAS Similarity Theorem

Lesson Summary:
Students will construct two similar triangles using Geometry software and discover the Side-Angle-Side Similarity Theorem

Key Words:
similar triangles, SAS Similarity Theorem

Background Knowledge:
Students should be familiar with the Geometry software.

Learning Objectives:
Students will discover the SAS Similarity Theorem and use it to prove that two triangles are similar.

Materials:
Geometry software

Suggested Procedure:
Split students into groups of two or three. Have students complete the worksheets.
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Group member’s names: _______________________________________________________

File name: _________________________________________________________________

Goal: Construct two similar triangles and determine the relationship of these two
triangles given the properties of the SAS Similarity Theorem.

Perform the following tasks using Cabri®:

1. Draw \( \triangle ABC \) using the polygon tool. Determine angle measurements and
   segment lengths. Label points, segments, and angles. [Use polygon, angle,
distance/length, and label tools]

2. Place a point ‘X’ where the new triangle is to be constructed. [Use point tool]

3. Use “Copy Angle” Macro that was completed prior to this lab to copy \( \angle CAB \)
at point X. [Use copy angle macro]

4. Determine length of \( \overline{AB} \) and \( \overline{AC} \) and label the lengths. [Use distance and length,
   and comment tools]

5. Pick some constant ‘k’ (for example 2) and use the calculator to determine
   \( k \times AB \). Label the calculated result. Repeat for \( k \times AC \) and label. [Calculator and
   comment tools]

6. Draw a ray from point X on line parallel to \( \overline{AB} \). Draw another ray from point
   X on line parallel to \( \overline{AC} \). [Use ray and parallel line tools]

7. Use Measurement Transfer to pick point ‘Y’ on the ray parallel to \( \overline{AB} \) to draw
   segment \( \overline{XY} \) so that length \( XY = k \times AB \). Repeat for point ‘Z’ on the line
   parallel to \( \overline{AC} \) to draw segment \( \overline{XZ} \) so that length \( XZ = k \times AC \). [Use
   measurement transfer and segment tools]

8. Draw segments \( \overline{XY} \) and \( \overline{XZ} \), measure their lengths and label them. Hide lines
   and rays through Y and Z, leaving only the segments visible. [Use segment,
9. Determine measure of $\angle CAB$ and $\angle ZXY$. \[Use \ angle \ tool\]

10. Draw segment $\overline{YZ}$. \[Use \ segment \ tool\]

11. To this point, how are triangles $\triangle CAB$ and $\triangle ZXY$ related?

12. Determine remaining segment lengths and angle measures of $\triangle XYZ$. \[Use \ distance/length \ and \ angle \ tools\]

13. What is true of $\angle ACB$ and $\angle XZY$? What is true of $\angle CBA$ and $\angle ZYX$?

14. Compare lengths of $\overline{BC}$ and $\overline{YZ}$. Can you see a relationship?

15. What can be said about the relationship between the two triangles?

16. Generalize what you have discovered about two triangles with two sides proportional and the angle between these sides congruent.

\* If you are not familiar with Cabri’s tools, press F1. A help menu for each tool selected will appear on the screen.
Journal Activity
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1. What was your favorite thing about this activity?

2. What was the most challenging thing?

3. What did you gain the most confidence about through completing this lesson?

4. Where do you possibly see yourself using this knowledge in the future?