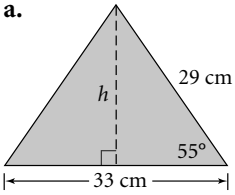
Investigation 1 • Area of a Triangle

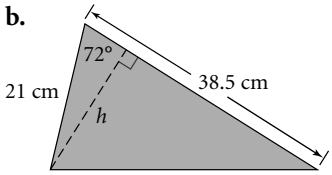
Name _____ **Period** _____ **Date** _____

Step 1 Find the area of each triangle. Use Example A as a guide.

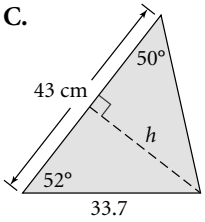
a.



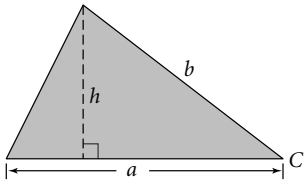
b.



C.



Step 2 Generalize Step 1 to find the area of this triangle in terms of a, b, and $\angle C$. State your general formula as your next conjecture.



SAS Triangle Area Conjecture

The area of a triangle is given by the formula $A =$ _____, where a and b are the lengths of two sides and C is the angle between them.

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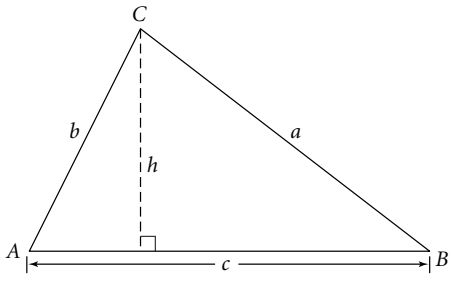
Investigation 2 • The Law of Sines

Name _____ **Period** _____ **Date** _____

Consider ΔABC with height h.

Step 1 Find h in terms of a and the sine of an angle.



Step 2 Find h in terms of b and the sine of an angle.

Step 3 Use algebra to show

$$\frac{\sin A}{a} = \frac{\sin B}{b}$$

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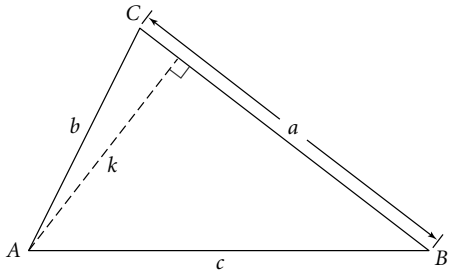
Now consider the same ΔABC using a different height, k.



Step 4 Find k in terms of c and the sine of an angle.

Step 5 Find k in terms of b and the sine of an angle.

Step 6 Use algebra to show

$$\frac{\sin B}{b} = \frac{\sin C}{c}$$

Step 7 Combine Steps 3 and 6. Complete this conjecture.

Law of Sines

For a triangle with angles A, B, and C and sides of lengths a, b, and c (a opposite A, b opposite B, and c opposite C),

$$\frac{\sin A}{\qquad} = \frac{\qquad}{b} = \frac{\qquad}{\qquad}.$$

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