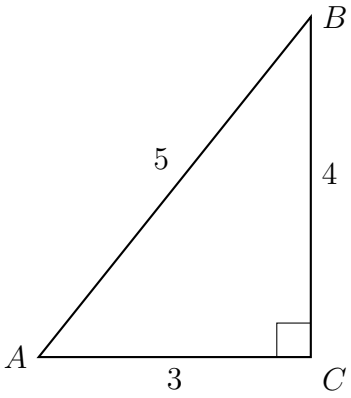
15.1 Classwork: Sine formula for the area of a triangle **HSG.SRT.D.9**

1. Right triangle $\triangle ABC$ is shown with side lengths marked. Identify the sides.

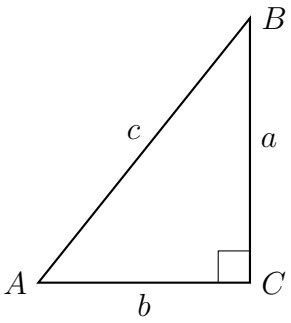
   (a) Which length is the hypotenuse?

   (b) Which length is *opposite* angle A?

   (c) Which length is *adjacent* to angle A?



2. $\triangle ABC$ is shown with $m\angle C = 90°$. The lengths of the triangle's sides are a, b, and c. Express each trigonometric ratio as a fraction of two variables.

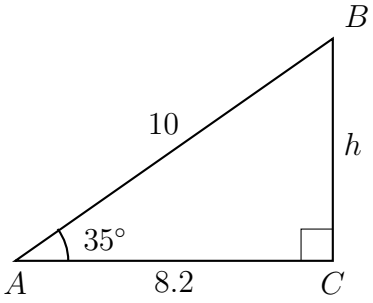


   (a) $\sin A =$

   (b) $\cos A =$

   (c) $\tan A =$

3. Use the sine function to find the height h of the right $\triangle ABC$ shown below.



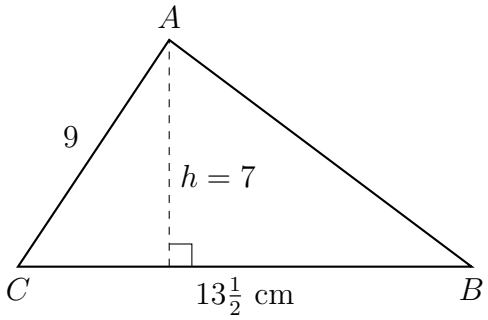
   Find the area of $\triangle ABC$ using the formula $A = \frac{1}{2}bh$

4. Given $\triangle ABC$ with $AC = 9$ centimeters, altitude $h = 7$ cm, and the base $BC = 13\frac{1}{2}$ cm. *diagram not to scale*

   (a) Write down $\sin C$ as a fraction.

   $\sin C =$

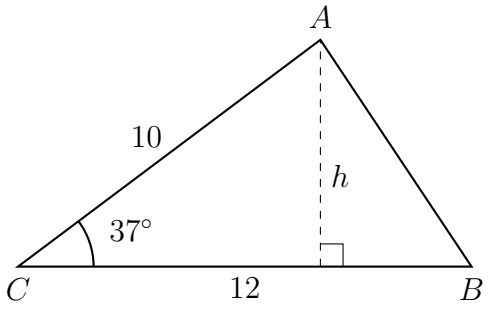
   (b) Find the area of $\triangle ABC$.



5. Two sides of $\triangle ABC$ are given $AC = 10$ and $BC = 12$, with the included angle $\text{m}\angle C = 37°$.

   (a) Find altitude h using $\sin 37° = \dfrac{h}{10}$.

   (b) Find the area of $\triangle ABC$.



Sine formula for the area of a triangle $A = \dfrac{1}{2}ab\sin C$

6. Find the area of the given triangle.