

Name:

### 12.1 Sine formula for the area of a triangle

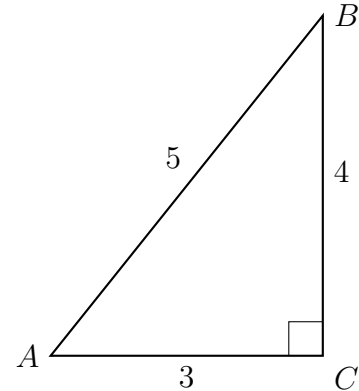
HSG.SRT.D.9

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

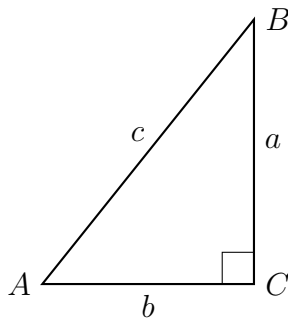
(a) Which length is the hypotenuse?

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

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



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

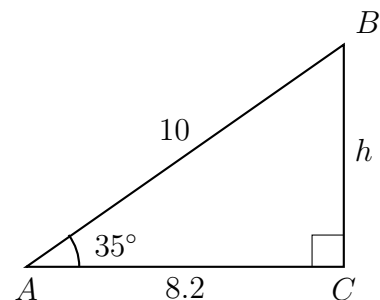


(a)  $\sin A =$

(b)  $\cos A =$

(c)  $\tan A =$

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



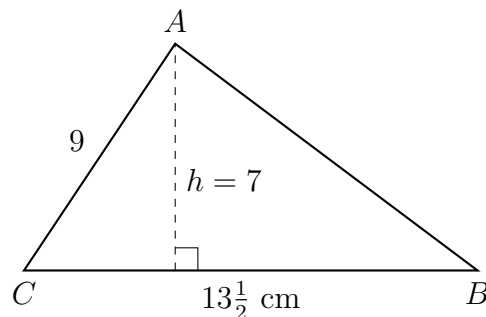
Find the area of  $\triangle ABC$  using the formula  $A = \frac{1}{2}bh$

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.

$$\sin C =$$

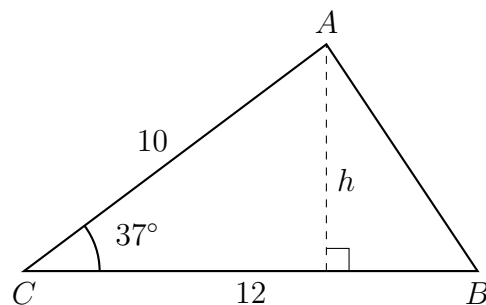
(b) Find the area of  $\triangle ABC$ .



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

(a) Find altitude  $h$  using  $\sin 37^\circ = \frac{h}{10}$ .

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



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

6. Find the area of the given triangle.

