

12.1 Sine formula for the area of a triangle

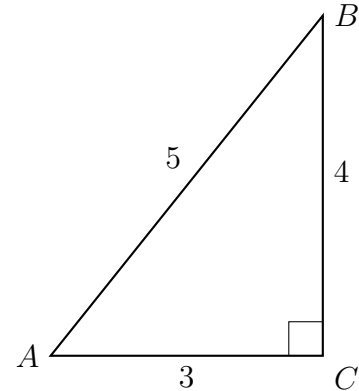
HSG.SRT.D.9

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

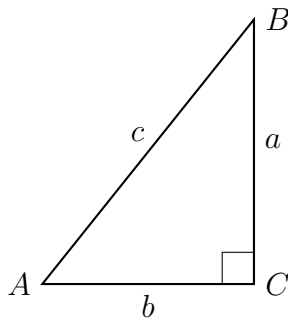
(a) Which length is the hypotenuse?

(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.

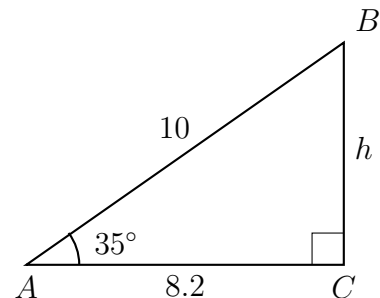


(a) $\sin A =$

(b) $\cos A =$

(c) $\tan A =$

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



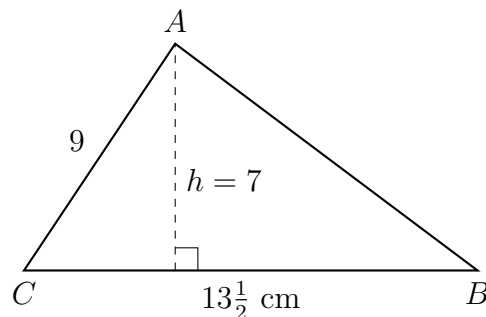
Find the area of $\triangle ABC$ using the formula $A = \frac{1}{2}bh$

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.

$$\sin C =$$

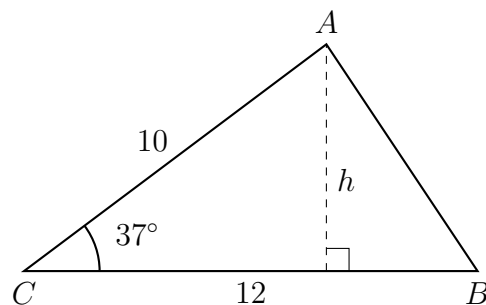
(b) Find the area of $\triangle ABC$.



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

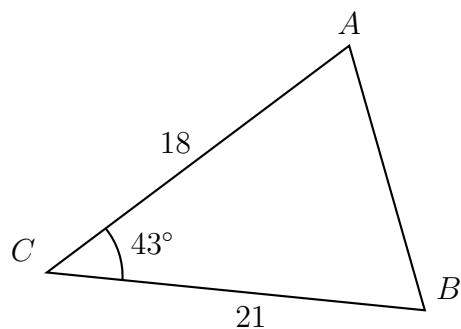
(a) Find altitude h using $\sin 37^\circ = \frac{h}{10}$.

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



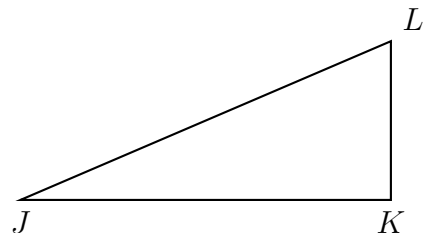
Sine formula for the area of a triangle $A = \frac{1}{2}ab \sin C$

6. Find the area of the given triangle.

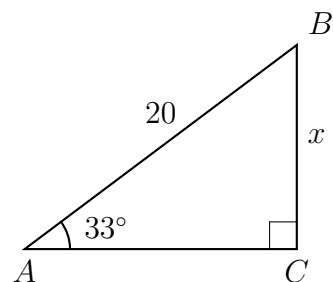


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7. Given right $\triangle JKL$ with $\overline{JK} \perp \overline{KL}$, $JL = 12.4$, $m\angle J = 41^\circ$. Find the length JK , rounded to the nearest hundredth.



8. Right triangle ABC is shown with $AB = 20$, $m\angle A = 33^\circ$. Find the value of $BC = x$.



9. Express the result to the nearest thousandth.

(a) $\sin 32^\circ =$

(c) $\cos 58^\circ =$

(b) $\cos 29^\circ =$

(d) $\sin 61^\circ =$

10. Express the result to the nearest whole degree.

(a) $\sin^{-1} 0.420 =$

(c) $\cos^{-1} 0.850 =$

(b) $\cos^{-1} 0.675 =$

(d) $\sin^{-1} 0.125 =$