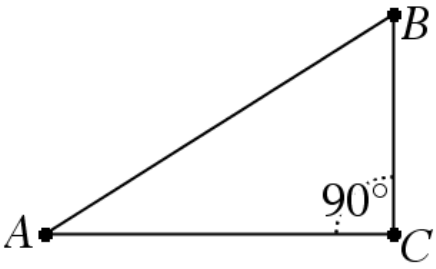
Problem 1 – Exploring Right Triangle Trigonometry

We will begin this activity by looking at the definitions of the sine, cosine, and tangent of a right triangle. Start the *Learning Check* application by pressing APPS and selecting **LearnChk.** Open the file *Trig*. You are given the definition for the sine, cosine, and tangent of a right triangle. Copy the definitions onto your worksheet.

1. What is the definition of sin *A* for right △*ABC*?

2. What is the definition of cos *A* for right △*ABC*?

3. What is the definition of tan *A* for right △*ABC*?

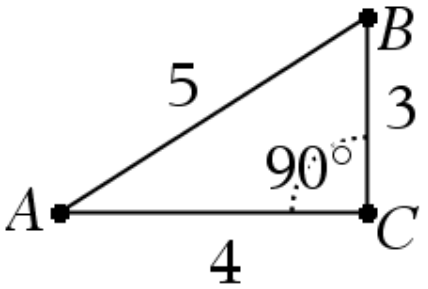


Answer the following questions about sine, cosine, and tangent for △*ABC*.

4. What is sin *A*?

5. What is cos *A*?

6. What is tan *A*?



7. What is sin *B*?

8. What is cos *B*?

9. What is tan *B*?

Problem 2 – Exploring the Sine Ratio of a Right Triangle

For this problem, we will investigate the sine ratio. Start the *Cabri™ Jr.* application by pressing APPS and selecting **Cabri™Jr**. Open the file *TRIG* by pressing Y=, selecting **Open…**, and selecting the file. You are given right triangle *ABC*.

10. Grab and drag point *B*. Record the data you collected in the table below. Leave the last column blank for now.

Position	*BC*	*AB*	$\frac{BC}{AB}$	$\sin^{-1}\frac{BC}{AB}$
1				
2				
3				
4				

11. What do you notice about the ratio of *BC* to *AB*?

12. Did $\angle A$ change when you moved point *B* in $\triangle ABC$?

Because the ratio remains the same and $\angle A$ remains fixed, we can use the ratio of *BC* to *AB* to find the measurement of $\angle A$. To do this, we will use the definition of sine and the inverse of sine. By definition, $\sin A = \frac{BC}{AB}$. To find the measurement of $\angle A$, we use the inverse of sine to get the formula $A = \sin^{-1}\frac{BC}{AB}$. Exit *Cabr ™Jr.* and go to the Home screen to find the inverse sine of $\frac{BC}{AB}$. Record this into the last column of the table above.

13. What is the measurement of $\angle A$?

14. What is the measurement of $\angle B$?

Problem 3 – Exploring the Cosine Ratio of a Right Triangle

For this problem, we will investigate the sine ratio. Start the *Cabri*^{TM} *Jr.* application and open the file *TRIG*. You are given right triangle *ABC*.

15. Collect data for four positions of point *B* as in Problem 2.

Position	*AC*	*AB*	$\frac{AC}{AB}$	$\cos^{-1}\frac{AC}{AB}$
1				
2				
3				
4				

Because the ratio remains the same, and $\angle A$ remains fixed, we can use the ratio of *AC* to *AB* to find the measurement of $\angle A$. To do this, we will use the definition of cosine and the inverse of cosine. By definition, $\cos A = \frac{AC}{AB}$. To find the measurement of $\angle A$, we use the inverse of cosine to get the formula $A = \cos^{-1}\frac{AC}{AB}$. Exit *Cabri*^{TM} *Jr.* and go to the home screen to find the inverse cosine of $\frac{AC}{AB}$. Record this into the last column of the table above.

16. What is the measurement of $\angle A$?

17. What is the measurement of $\angle B$?

18. How would you solve an equation of the form $\tan A = \frac{BC}{AC}$ to find the measure of $\angle A$?

Problem 4 – Applying the Sine, Cosine, and Tangent Ratios of a Right Triangle

Find and label the measure of each angle given two sides of the right triangle.

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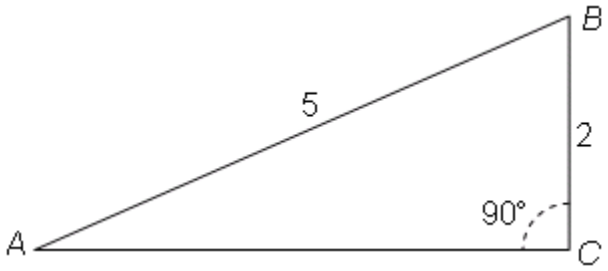

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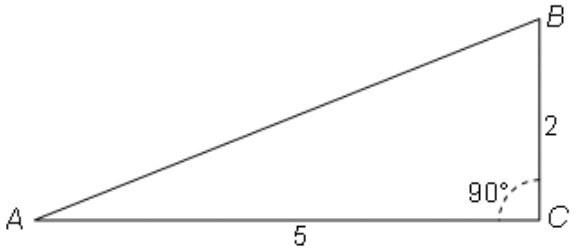

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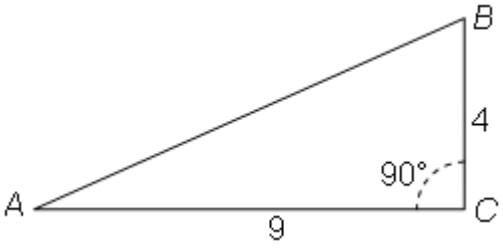

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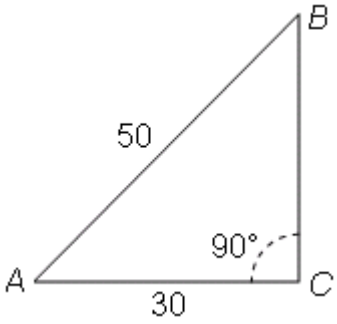

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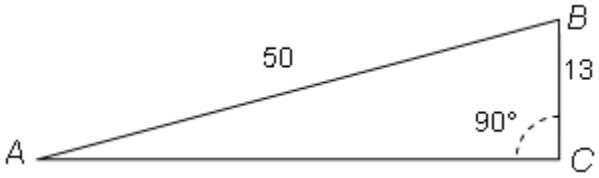

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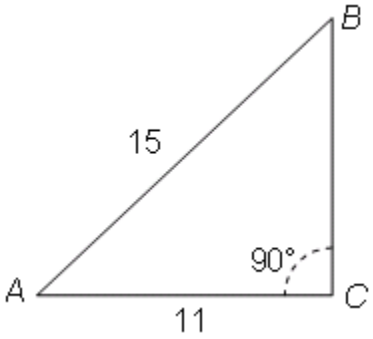

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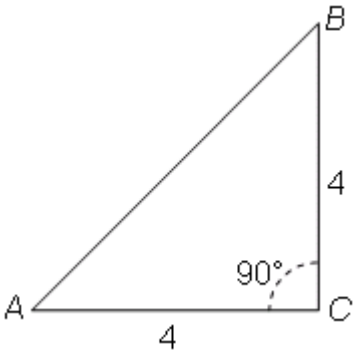

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