## 11-7 Trigonometric Ratios *(Pages 623–630)*

In a right triangle, the side opposite the right angle is the longest side. This side is called the **hypotenuse**. The other two sides are the **legs**.

Definition of Trigonometric Ratios	sine of $\angle A$ = $\dfrac{\text{measure of leg opposite } \angle A}{\text{measure of hypotenuse}}$	$\sin A = \dfrac{a}{c}$	
	cosine of $\angle A$ = $\dfrac{\text{measure of leg adjacent } \angle A}{\text{measure of hypotenuse}}$	$\cos A = \dfrac{b}{c}$	
	tangent of $\angle A$ = $\dfrac{\text{measure of leg opposite } \angle A}{\text{measure of leg adjacent } \angle A}$	$\tan A = \dfrac{a}{b}$	
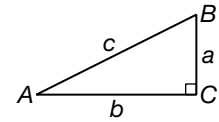
Examples

a. Find the sine, cosine, and tangent of angle Q.

$\sin Q = \dfrac{opposite\ leg}{hypotenuse}$ $\cos Q = \dfrac{adjacent\ leg}{hypotenuse}$ $\tan Q = \dfrac{opposite\ leg}{adjacent\ leg}$

$= \dfrac{9}{15}$ or 0.6 $= \dfrac{12}{15}$ or 0.8 $= \dfrac{9}{12}$ or 0.75
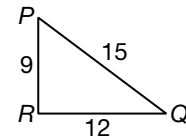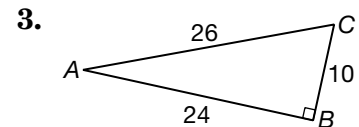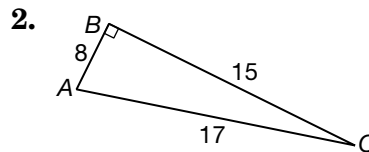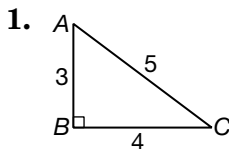
b. Find the measure of angle P, $m\angle P$, to the nearest degree.

$\sin P = \dfrac{opposite\ leg}{hypotenuse}$ $\Rightarrow$ $\sin P = \dfrac{12}{15}$ or 0.8

Use a scientific calculator to find the angle measure with a sine of 0.8.

Enter: 0.8 [2nd] [SIN⁻¹]   **Result:** 53.13010235   So, $m\angle P \approx 53°$.

Practice

For each triangle, find sin *C*, cos *C*, and tan *C* to the nearest thousandth. Use a calculator to find the value of each trigonometric ratio to the nearest ten thousandth if necessary.
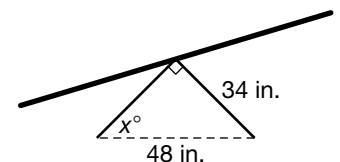
1.

2.

3.

4. sin 14°   **5.** cos 68°   **6.** tan 80°   **7.** cos 60°   **8.** sin 85°

Use a calculator to find the measure of each angle to the nearest degree.

9. sin B = 0.8192   **10.** cos M = 0.7660   **11.** tan W = 0.2309

12. cos Y = 0.7071   **13.** sin P = 0.9052   **14.** tan K = 0.2675

15. **Standardized Test Practice** Which equation can be used to find the measure of the angle measuring $x°$ under the seesaw?

A $\sin (x°) = \dfrac{48}{34}$ **B** $\cos (x°) = \dfrac{48}{34}$

C $\sin (x°) = \dfrac{34}{48}$ **D** $\tan (x°) = \dfrac{34}{48}$