Chapter 8: Right Triangles & Trigonometry

SECTION 3: SOLVING RIGHT TRIANGLES

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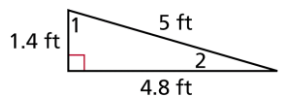
I Can

- Use trig ratios to find angle measures in right triangles & solve real problems

Example

Use the trigonometric ratio $\cos A = \frac{24}{25}$ to determine which angle of the triangle is $\angle A$.



Going Backwards

In Lesson 8-2, we learned that sin 30° = 0.5.

If you know that the sine of an acute angle is 0.5, you can go backwards and say that the angle measures 30°.

This is written as $\sin^{-1}(0.5) = 30°$.

Going Backwards

If you know the sine, cosine, or tangent of an acute angle measure, you can use the inverse trigonometric functions to find the measure of the angle.

Inverse Trigonometric Functions
If $\sin A = x$, then $\sin^{-1} x = m\angle A$.
If $\cos A = x$, then $\cos^{-1} x = m\angle A$.
If $\tan A = x$, then $\tan^{-1} x = m\angle A$.

Example

Use your calculator to find each angle measure to the nearest degree.

A. $\cos^{-1}(0.87)$ **B.** $\sin^{-1}(0.85)$ **C.** $\tan^{-1}(0.71)$

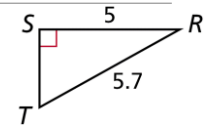
Solving Triangles

Using given measures to find the unknown angle measures or side lengths of a triangle is known as *solving a triangle*.

To solve a right triangle, you need to know two side lengths or one side length and an acute angle measure.

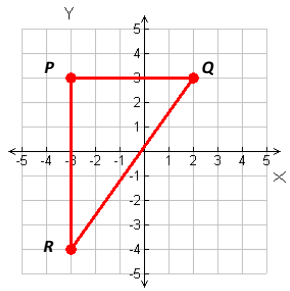
Example

Find the 3 unknown measures. Round lengths to the nearest hundredth and angle measures to the nearest degree.



Example

The coordinates of the vertices of ΔPQR are $P(-3, 3)$, $Q(2, 3)$, and $R(-3, -4)$. Find the side lengths to the nearest hundredth and the angle measures to the nearest degree.



Example

The steepness of a road is often expressed as a *percent grade*. If a road has a 31.5% grade, the road rises 31.5 ft over a horizontal distance of 100 ft.

A highway sign warns that a section of road ahead has a 7% grade. To the nearest degree, what angle does the road make with a horizontal line?

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