Geometry Lesson 82

Date: _____

Objective: TSW use more applications of trigonometry.

Period: _____

The sine, cosine, and tangent ratios can be used to find the length of a side of a right triangle. These trigonometric ratios can also be used to find the measure of an angle given two side lengths. To do this, the inverse of each trigonometric function is needed.

Reading Math

The Greek letter θ (theta) is used to denote the unknown measure of an angle.

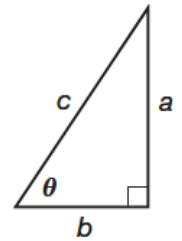The inverse sine is the measure of an angle where the sine ratio is known.

The inverse cosine is the measure of an angle where the cosine ratio is known.

The inverse tangent is the measure of an angle where the tangent is known.

The inverse of the sine function is written sin^{-1}. In the diagram, the measure of the unknown angle, θ, can be determined using an inverse trigonometric function as shown below.
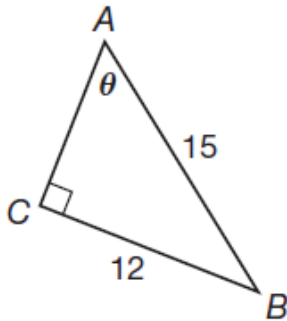
$$\theta = sin^{-1}\underline{\qquad\qquad} \qquad \theta = cos^{-1}\underline{\qquad\qquad} \qquad \theta = tan^{-1}\underline{\qquad\qquad}$$

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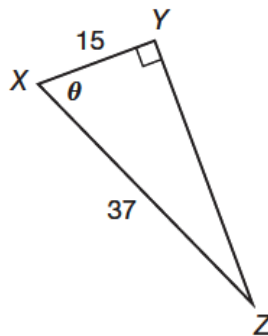
Example 1 Using Inverse Sine
Find ϑ to the nearest degree.

SOLUTION

Example 2 Using Inverse Cosine
Find ϑ to the nearest degree.

SOLUTION

Example 3 Using Inverse Tangent
Find ϑ to the nearest tenth of a degree.

SOLUTION

Example 4 Application: Architecture

Below is the design for a bridge. Find θ_1 and θ_2 to the nearest tenth of a degree.

SOLUTION

You Try!!!!

a. Find θ_1 to the nearest degree.
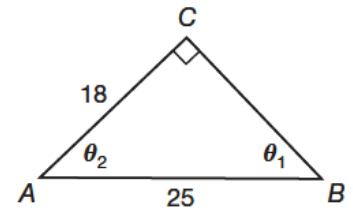
b. Find θ_2 to the nearest degree.

c. In a right triangle, the side that is opposite angle ϑ measures 72 centimeters and the side adjacent to angle ϑ is 90 centimeters. Find ϑ.

d. A children's piano is made with right triangle supports. The hypotenuse is 2 feet long and the height of the piano is 18 inches. What is ϑ, to the nearest degree?