Lesson 13–7

Example 1 Solve an Equation

Solve $\operatorname{Cos} x = -\dfrac{\sqrt{2}}{2}$.

If $\operatorname{Cos} x = -\dfrac{\sqrt{2}}{2}$, then x is the least value whose cosine is $-\dfrac{\sqrt{2}}{2}$. So, $x = \operatorname{Arccos} -\dfrac{\sqrt{2}}{2}$.
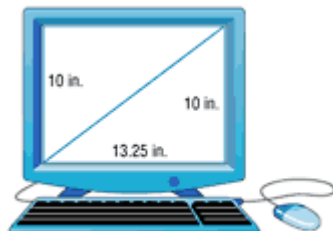
Use a calculator to find x.

KEYSTROKES: [2nd] [COS⁻¹] [(-)] [2nd] [√] 2 [)] [÷] 2 [)] [ENTER]   135

Therefore, $x = 135°$ or $\dfrac{3\pi}{4}$.

Example 2 Apply an Inverse to Solve a Problem

TECHNOLOGY The monitor of a computer has a screen that measures 13.25 inches across by 10 inches down. What are the measures of the acute angles of one of the triangles formed by drawing a diagonal across the screen?

Draw a diagram for the situation. You can see that a right triangle is formed with legs of length 13.25 and 10 and that the hypotenuse is the diagonal. You need to find the measure of angles α and θ.

To find the measure of angle θ, use the tangent ratio for right triangles.

$\tan \theta = \dfrac{\text{opp}}{\text{adj}}$ Tangent ratio

$\tan \theta = \dfrac{13.25}{10}$ Replace opp with 13.25 and adj with 10.

$\theta = \tan^{-1}\left(\dfrac{13.25}{10}\right)$ Inverse tangent function.

$\theta \approx 53°$ Use a calculator.

If $\theta \approx 53°$, then α is approximately $90° - 53°$ or $37°$.

Therefore, the measures of the acute angles of the triangle are about $37°$ and $53°$.

Example 3 Find a Trigonometric Value

Find the value of $\cos\left(\text{Tan}^{-1}\dfrac{3}{4}\right)$ **to the nearest hundredth radian.**

KEYSTROKES: [COS] [2nd] [TAN^{-1}] 3 [÷] 4 [)] [)] [ENTER] .8

Therefore, $\cos\left(\tan^{-1}\dfrac{3}{4}\right) = 0.8.$