Common Trigonometry Mistakes

Example: Value of inverse cosine

The Goal

Find

$$\cos^{-1}(0)$$

The Mistake

Find the mistake:

$$\cos^{-1}(0) = \frac{1}{\cos(0)} = \frac{1}{1} = 1$$

Need a hint? Look carefully at the red part:

$$\cos^{-1}(0) = \frac{1}{\cos(0)} = \frac{1}{1} = 1$$

The Correction

$$\cos^{-1}(0) = \frac{\pi}{2} \text{ since } \cos\left(\frac{\pi}{2}\right) = 0 \text{ and } \frac{\pi}{2} \text{ is in the interval from 0 to } \pi$$

An Explanation

In this mistake the notation $\cos^{-1}(x)$ has been misunderstood to mean $1/\cos(x)$. That interpretation might seem to be a natural extension of notation such as $\cos^2(x)$, which does mean $(\cos(x))^2$, and $\cos^{-2}(x)$, which does mean $1/(\cos(x))^2$. However, for any function f(x), *by convention* when we write $f^{-1}(x)$, we mean instead the *inverse function* for f(x). So $\cos^{-1}(x)$ means *the inverse cosine of x*, that is, the function that *undoes* the cosine function.

Visit Trigonometry Facts for help in learning values of the inverse trigonometric functions.