

Math 1613 - Trigonometry

Quiz #17 - 2011.10.13

Solutions

1. State the *domains* and *ranges* of the three functions $\sin^{-1}(x)$, $\cos^{-1}(x)$ and $\tan^{-1}(x)$.

Function	Domain	Range
$\sin^{-1}(x)$	$[-1, 1]$	$\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$
$\cos^{-1}(x)$	$[-1, 1]$	$[0, \pi]$
$\tan^{-1}(x)$	$(-\infty, \infty)$	$\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

2. Evaluate exactly the expression $\tan\left(\cos^{-1}\left(\frac{1}{\sqrt{2}}\right)\right)$

First, note that $\cos^{-1}\left(\frac{1}{\sqrt{2}}\right) = \frac{\pi}{4}$ since $\cos\left(\frac{\pi}{4}\right) = \frac{1}{\sqrt{2}}$. Thus, we have $\tan\left(\cos^{-1}\left(\frac{1}{\sqrt{2}}\right)\right) = \tan\left(\frac{\pi}{4}\right) = 1$.