

Precalculus, Section 7.2, #26
The Inverse Trigonometric Functions (Continued)

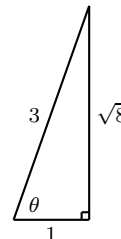
Find the exact value of each expression.¹

26. $\tan\left(\cos^{-1}\left(\frac{1}{3}\right)\right)$

First we evaluate $\cos^{-1}\left(\frac{1}{3}\right)$.

$\cos^{-1}\left(\frac{1}{3}\right)$ is the angle between 0 and π whose cosine is $\frac{1}{3}$. We can sketch a triangle that shows this angle with adjacent side as 1 and hypotenuse as 3. A quick application of the Pythagorean Theorem gives the third side as $\sqrt{8} = 2\sqrt{2}$.

Then $\tan\left(\cos^{-1}\left(\frac{1}{3}\right)\right) = \tan(\theta) = \frac{2\sqrt{2}}{1} = 2\sqrt{2}$.

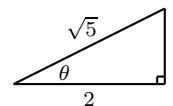


34. $\csc\left(\tan^{-1}\left(\frac{1}{2}\right)\right)$

First we evaluate $\tan^{-1}\left(\frac{1}{2}\right)$.

$\tan^{-1}\left(\frac{1}{2}\right)$ is the angle between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$ whose tangent is $\frac{1}{2}$. We can sketch a triangle that shows this angle with opposite side as 1 and adjacent side as 2. A quick application of the Pythagorean Theorem gives the hypotenuse as $\sqrt{5}$.

Then $\csc\left(\tan^{-1}\left(\frac{1}{2}\right)\right) = \csc(\theta) = \frac{\sqrt{5}}{1} = \sqrt{5}$.



¹Sullivan, *Precalculus: Enhanced with Graphing Utilities*, p. 457, #26.