Finding Exact Values

To evaluate the expression \( \cot \left( \cos^{-1} \left( \frac{4}{5} \right) \right) \), you can sketch a right triangle and observe that \( \cos^{-1} \left( \frac{4}{5} \right) = \angle A \). Now use the Pythagorean theorem to solve for the unknown side.

\[
a^2 + 4^2 = 5^2
\]
\[
a^2 = 25 - 16
\]
\[
a = \sqrt{9} = 3
\]

And now we have \( \cot \left( \cos^{-1} \left( \frac{4}{5} \right) \right) = \cot A = \frac{4}{3} \).

Checking with a calculator we can see the solution.

\[
(\tan(\cos^{-1}(4/5)))^{-1} = 1.333333333
\]
Exploring Inverses

To evaluate the expression \( \sin^{-1}\left(\sin\left(\frac{5\pi}{4}\right)\right) \)
you have to know the range for inverse sine
which are \(-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}\) and then use the
Unit Circle to help you solve the problem.

Now \( \sin\left(\frac{5\pi}{4}\right) = -\frac{\sqrt{2}}{2} \) and \( \sin^{-1}\left(-\frac{\sqrt{2}}{2}\right) = -\frac{\pi}{4} \), so \( \sin^{-1}\left(\sin\left(\frac{5\pi}{4}\right)\right) = -\frac{\pi}{4} \).

Checking with a calculator we can see the solution.

\[
\begin{align*}
\sin^{-1}(\sin(5\pi/4)) & \approx -0.7853981634 \\
-\pi/4 & \approx -0.7853981634
\end{align*}
\]