

Activity - Expressions Involving Inverse Trig Functions

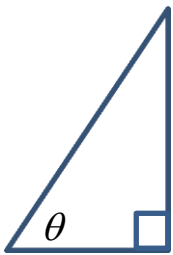
Write down necessary steps and answers clearly to earn full credit.

Compositions of trigonometric and inverse trigonometric functions can be evaluated without a calculator even if the argument (the angle) is not a special value. You will use right triangle diagrams and the definition of trigonometric functions as ratios to evaluate some of these expressions below.

1. Find the value of $\tan\left(\cos^{-1}\left(\frac{3}{5}\right)\right)$

a) Rewrite $\theta = \cos^{-1}\left(\frac{3}{5}\right)$ by filling in the blanks: $\cos(\underline{\quad}) = \underline{\quad}$

b) Label the triangle according to the information in part a) and find the length of the remaining side using the Pythagorean theorem. (Note: The triangle is not necessarily drawn to scale.)



c) Find $\tan(\theta)$ by using your labeled triangle. This will be the value of $\tan\left(\cos^{-1}\left(\frac{3}{5}\right)\right)$.

2. Evaluate the expression $\tan\left(\cos^{-1}(x)\right)$. Assume $-1 \leq x \leq 1$

a) Rewrite $\theta = \cos^{-1}\left(\frac{x}{1}\right)$ by filling in the blanks: $\cos(\underline{\quad}) = \underline{\quad}$

b) Label the triangle according to the information in part a) and find the length of the remaining side using the Pythagorean theorem. (Note: The triangle is not necessarily drawn to scale.)



c) Find $\tan(\theta)$ by using your labeled triangle. This will be an algebraic expression equivalent to $\tan\left(\cos^{-1}(x)\right)$.