7.2 The Inverse Trigonometric Functions (Continued)

When finding the inverse secant or inverse cosecant functions, we can use the below formulas. There is no equivalent formula for the inverse cotangent function, so it's definition is a little different.

$y = \sec^{-1} x = \cos^{-1}\left(\frac{1}{x}\right)$ where $|x| \geq 1$ and $0 \leq y \leq \pi$ and $y \neq \frac{\pi}{2}$

$y = \csc^{-1} x = \sin^{-1}\left(\frac{1}{x}\right)$ where $|x| \geq 1$ and $-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$ and $y \neq 0$

$y = \cot^{-1} x$ where $-\infty < x < \infty$ and $0 \leq y \leq \pi$

EXAMPLE: Find the exact value of $\sec^{-1}(2)$.

EXAMPLE: Find the exact value of $\csc^{-1}\left(-\sqrt{2}\right)$.

EXAMPLE: Find the exact value of $\cot^{-1}\left(-\sqrt{3}\right)$.

EXAMPLE: Use a sketch to find the exact value: $\sin\left(\cos^{-1}\left(\frac{3}{5}\right)\right)$.

EXAMPLE: Use a sketch to find the exact value: $\cos\left(\sin^{-1}\left(-\frac{1}{\sqrt{6}}\right)\right)$.

EXAMPLE: Use a sketch to find the exact value: $\tan\left(\cos^{-1}\left(-\frac{3}{4}\right)\right)$.

EXAMPLE: Find the exact value: $\csc\left(\tan^{-1}\left(-\frac{1}{3}\right)\right)$.

EXAMPLE: Use right triangles to write in algebraic form: $\cos\left(\sin^{-1} u\right)$. Assume that u is positive and that the given inverse trigonometric function is defined for the expression in u.

EXAMPLE: Use right triangles to write in algebraic form: $\sec\left(\tan^{-1} 4u\right)$. Assume that u is positive and that the given inverse trigonometric function is defined for the expression in u.