MATH 141, Review Sheet on Inverse Trig Functions

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function	**domain**	**range**	**derivative**	**integral**
$\sin^{-1}(x)$	$[-1, 1]$	$[-\frac{\pi}{2}, \frac{\pi}{2}]$	$\frac{1}{\sqrt{1-x^2}}$	$x \sin^{-1}(x) + \sqrt{1-x^2} + C$
$\cos^{-1}(x)$	$[-1, 1]$	$[0, \pi]$	$\frac{-1}{\sqrt{1-x^2}}$	$x \cos^{-1}(x) - \sqrt{1-x^2} + C$
$\tan^{-1}(x)$	$(-\infty, \infty)$	$(-\frac{\pi}{2}, \frac{\pi}{2})$	$\frac{1}{1+x^2}$	$x \tan^{-1}(x) - \frac{1}{2}\ln(1+x^2) + C$
$\cot^{-1}(x)$	$(-\infty, \infty)$	$(0, \pi)$	$\frac{-1}{1+x^2}$	$x \cot^{-1}(x) + \frac{1}{2}\ln(1+x^2) + C$
$\sec^{-1}(x)$	$(-\infty, -1] \cup [1, \infty)$	$[0, \frac{\pi}{2}) \cup [\pi, \frac{3\pi}{2})$	$\frac{1}{x\sqrt{x^2-1}}$	$x \sec^{-1}(x)$ $- \ln(x + \sqrt{x^2-1}) + C$
$\csc^{-1}(x)$	$(-\infty, -1] \cup [1, \infty)$	$(0, \frac{\pi}{2}] \cup (\pi, \frac{3\pi}{2}]$	$\frac{-1}{x\sqrt{x^2-1}}$	$x \csc^{-1}(x)$ $+ \ln(x + \sqrt{x^2-1}) + C$

Note: Not all books use the same convention regarding the range of the function $\csc^{-1}(x)$ in the case where x is negative. We are using the convention in Ellis and Gulick, but a more common convention is to replace $(\pi, \frac{3\pi}{2}]$ by $[\frac{-\pi}{2}, 0)$. Because of the potential for confusion, we will avoid using $\csc^{-1}(x)$ when x is negative.