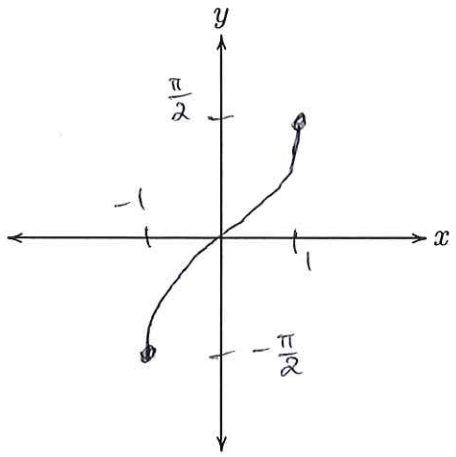
Math 226 Sections 7 and 10 Quiz 3 Solutions 9/13/17

Name:_____

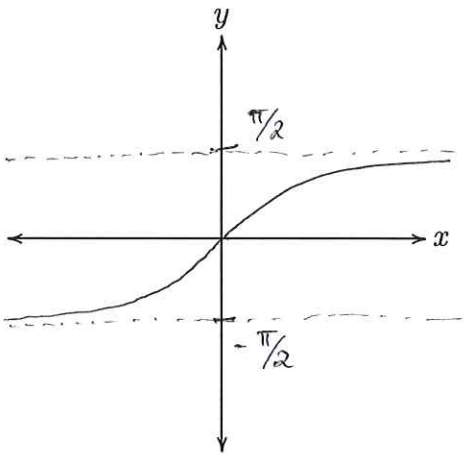
Name:_____

Name:_____

1. Sketch a graph of $y = \sin^{-1}(x)$. Clearly indicate the domain and range in your sketch.



2. Sketch a graph of $y = \tan^{-1}(x)$. Clearly indicate the domain and range in your sketch.

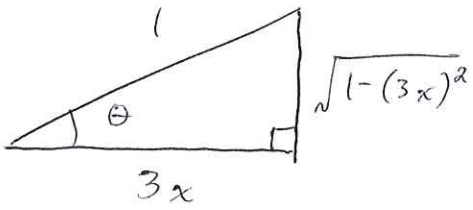


3. Evaluate $\int \csc(\arccos(3x))dx$.

$\csc(\arccos(3x)) = \csc(\theta) = \frac{1}{\sqrt{1-(3x)^2}}$

$\theta = \arccos(3x)$

$\cos\ \theta = 3x$



$\int \csc(\arccos(3x))\,dx$

$= \int \frac{1}{\sqrt{1-(3x)^2}}\,dx$

$= \boxed{\frac{1}{3}\arcsin(3x) + C}$

4. Evaluate each limit.

(a) $\lim_{x\to 1}\left(\frac{7x}{x-1}-\frac{7}{\ln(x)}\right) = \lim_{x\to 1}\frac{7x\ln x - 7(x-1)}{(x-1)\ln x}$

type $\frac{0}{0}$

$\overset{l'H}{=} \lim_{x\to 1}\frac{7\ln x + 7x\cdot\frac{1}{x} - 7}{\ln x + \left(\frac{x-1}{x}\right)} = \lim_{x\to 1}\frac{7\ln x}{\ln x + 1 - \frac{1}{x}}$

type $\frac{0}{0}$

$\overset{l'H}{=} \lim_{x\to 1}\frac{\left(\frac{7}{x}\right)}{\left(\frac{1}{x}\right)+\left(\frac{1}{x^2}\right)} = \boxed{\frac{7}{2}}$

(b) $\lim_{x\to 0^+}\frac{\arccos(x)}{\ln(x)}$

$\lim_{x\to 0^+}\arccos(x) = \frac{\pi}{2}$ and $\lim_{x\to 0^+}\ln(x) = -\infty$,

so $\lim_{x\to 0^+}\frac{\arccos(x)}{\ln(x)} = \boxed{0}$

(c) $\lim_{x\to\infty} x^{1/x} = e^{\lim_{x\to\infty}\ln(x^{1/x})} = e^0 = \boxed{1}$

$\lim_{x\to\infty}\ln(x^{1/x}) = \lim_{x\to\infty}\frac{\ln x}{x} \overset{l'H}{=} \lim_{x\to\infty}\frac{\left(\frac{1}{x}\right)}{1} = 0$

type $\frac{\infty}{\infty}$