Quiz 2 Math 152 Print Name: Time

Show your work.

1. If $f'(x) = -\frac{2}{\sqrt{1-x^2}}$, $f(0) = \pi$. Find f.

   Solution: (Method 1) If you use $f(x) = \int -\frac{2}{\sqrt{1-x^2}}dx = -2\sin^{-1}x + C$, then since $\arcsin 0 = 0,$ we have $C = \pi,$ which implies that $f(x) = -2\sin^{-1}x + \pi.$

   Method II. If you use $f(x) = \int -\frac{2}{\sqrt{1-x^2}}dx = 2\cos^{-1}x + C,$ then since $\arccos 0 = \frac{1}{2}\pi,$ this implies that $C = 0,$ which means that $f(x) = 2\cos^{-1}x.$ It follows from Method I and Method II above that $-2\sin^{-1}x + \pi = 2\cos^{-1}x.$ (Try to prove this by using graphs!!)
2. Find $\int\left(3x^{-1} + 8\sin x + \frac{2}{1+x^2}\right)dx$ [Ans. $3\ln x - \pi - 8\cos x + 2\arctan x + C$].
3. Use Newton's Rule to estimate the zero of $\tan x - (3x+1) = 0,$ where $-\frac{\pi}{2} < x < \frac{\pi}{2},$ correct up to 6 decimal places. [Notice there are three zeros in the range, x=-1.205883768447,-0.527538342223, and xc=1.378477437013.
4. Prove $\frac{d}{dx}(\cos^{-1}x) = -\frac{1}{\sqrt{1-x^2}}.$