

NAME: SOLUTIONS

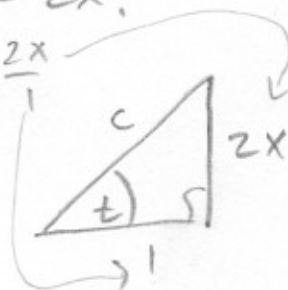
Math 105 - Quiz 10 - October 31, 2007

Instructions: Show all of your work and circle your final answers. Calculators are allowed, but notes and books are not.

1. (10 pts.) Simplify $f(x) = \cos(\arctan(2x))$.

Let $t = \arctan(2x)$, so $\tan(t) = 2x$.

$$\frac{\text{opposite}}{\text{adjacent}} = \frac{2x}{1}$$



let hypotenuse = c .

$$\text{Then } 1^2 + (2x)^2 = c^2, \text{ so } c = \sqrt{1+4x^2}.$$

$$\text{So } \cos(\arctan(2x)) = \cos(t) = \frac{\text{adj}}{\text{hyp}} = \boxed{\frac{1}{\sqrt{1+4x^2}}}.$$

2. (10 pts.) Let $g(x) = \frac{\ln x}{\sqrt{2+\cos x}}$. Find $g'(x)$.

$$\text{quotient rule: } g'(x) = \frac{\sqrt{2+\cos x} \cdot \frac{d}{dx}(\ln x) - \frac{d}{dx}(\sqrt{2+\cos x}) \cdot \ln x}{(\sqrt{2+\cos x})^2}$$

$$= \frac{(\sqrt{2+\cos x}) \cdot \frac{1}{x} - \frac{1}{2}(2+\cos x)^{-1/2} \cdot (-\sin x) \cdot \ln x}{2+\cos x}.$$

$$2 + \cos x.$$