Calculus I, Sections 4, 5, 6.

Practice for Quiz 2

If you know your stuff, this should take about an hour. The actual quiz will be about a quarter this long and should take about fifteen minutes.

1. Calculate the derivatives of the following functions:

a. $f(x) = \dfrac{x}{\sqrt{1+x^2}}$

b. $f(x) = \sin(\frac{1}{x})$

c. $g(s) = \cos^2(\tan(s))$

d. $u(t) = \dfrac{1}{2+\cos(t)}$

e. $f(t) = \sqrt{t\tan(t)}$.

2. Compute $\dfrac{d^2}{dt^2}\cos(t^2)$.

3. Suppose $u = \dfrac{1}{A^2}$ and when $t = 1$, $A(t) = 4$ and $A'(t) = -5$. What is the value of $\dfrac{du}{dt}$ when $t = 2$?

4. Show that $\lim\limits_{x\to 0} x\sin(\dfrac{1}{x})$ exists but that $\lim\limits_{x\to 0}\dfrac{d}{dx}\left(x\sin(\dfrac{1}{x})\right)$ does not.

5. Starting from a spot in Central Park, I walked 40 feet east then 30 feet north. I wind up 50 feet from the starting point. About how much farther north should I walk to increase the distance from my starting point by 2%?

6. A point P is on the circle of radius 3 centered at the origin. The point makes an angle θ with the x axis. The point Q has coordinates $(1, 2)$. The distance between P and Q is F. Write a formula for $\frac{dF}{d\theta}$.