Calculus I, Fall 2014
Quiz 5 Name: _____

You must show all your work to receive credit. Calculators are allowed.

Problem 1: (6 points) Find the following derivatives:

a) $\frac{d}{dx}(-x^2+4)^4$ $= 4(-x^2+4)^3 \cdot (-2x)$

b) $\frac{d}{dt}\cos(1+\frac{1}{t})$ $= -\sin\left(1+\frac{1}{t}\right)\cdot\left(-1/t^2\right)$

c) $(\sec^2(2x)+4x)'$ $= 2\sec(2x)\cdot\tan(2x)\sec(2x)\cdot 2 + 4$

Problem 2: (2 points) Let $F(x) = f(g(x))$. If

$$g(2)=1, \quad f'(1)=3, \quad g'(2)=-4,$$

find $F'(2)$.

$F'(2) = f'(g(2))\cdot g'(2) = f'(1)\cdot g'(2) = 3\cdot(-4) = -12$

Problem 3: (2 points) Find $\lim_{\theta\to 0}(\theta\cot(2\theta))$.

$$\lim_{\theta\to 0} \theta\cot(2\theta) = \lim_{\theta\to 0} \frac{\theta\cos 2\theta}{\sin 2\theta} = \lim_{\theta\to 0} \frac{\cos 2\theta}{\frac{\sin 2\theta}{\theta}}$$

$$= \frac{\lim_{\theta\to 0}\cos 2\theta}{2\lim_{\theta\to 0}\frac{\sin 2\theta}{2\theta}} = \frac{1}{2\cdot 1} = \frac{1}{2}$$