Math 124 Quiz #6 Name: _____
November 3, 2009

Simplify your answers. Show all work on a separate paper stapled to this sheet. No calculators permitted.

1. Differentiate the following. Do **not** simplify your answers.

   (a) (1 pts.) $y = 11^{\sec x}$

   (b) (3 pts.) $f(t) = \arcsin(e^t) \ + \ 5t(-3 + 2t^3)^6$

2. (4 pts.) Find an equation of the tangent line to the curve $2x^4 + xe^y \ = \ 3 - y^8$ at the point $(1, 0)$.

3. Suppose the position (in inches) of an oscillating spring is given by $s = f(t) = 10\sin(\pi t)$ at t seconds.

   (a) (1 pts.) Find formulas for the velocity and acceleration.

   (b) (1 pts.) What is the maximum velocity of the spring? Include units.

Note: Here are **some** derivative rules.

$\frac{d}{dx}[\tan x] = \sec^2 x$ $\frac{d}{dx}[\sec x] = \sec x \cdot \tan x$ $\frac{d}{dx}[a^x] = a^x \cdot \ln(a)$ $\frac{d}{dx}[\arcsin x] = \frac{1}{\sqrt{1-x^2}}$ $\frac{d}{dx}[\arctan x] = \frac{1}{1+x^2}$