

Math 124 Quiz #5  
May 6, 2008

Name: \_\_\_\_\_

Show all work.

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

(a) (3 pts.)  $f(x) = \frac{\cos x - 1}{7x}$

(b) (3 pts.)  $y = 8e^{-x} + 2^{\tan x}$

2. Suppose the position (in inches) of an oscillating spring is given by  $s = f(t) = 5 \sin(\pi t)$  at  $t$  seconds.

(a) (3 pts.) Find the velocity and acceleration at 2 seconds. Include units in your answers.

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

---

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

$$\frac{d}{dx} \left[ \frac{f(x)}{g(x)} \right] = \frac{g(x) \cdot f'(x) - f(x) \cdot g'(x)}{[g(x)]^2}$$

$$\frac{d}{dx} [f(g(x))] = f'(g(x)) \cdot g'(x)$$

$$\frac{d}{dx} [a^x] = a^x \cdot \ln a$$

$$\frac{d}{dx} [\sin x] = \cos x$$

$$\frac{d}{dx} [\cos x] = -\sin x$$

$$\frac{d}{dx} [\tan x] = \sec^2 x$$

$$\frac{d}{dx} [\sec x] = \sec x \cdot \tan x$$