

Math 124 D Fall 2001
Quiz #6, Week 7

Name _____ (please print)
Section DB and DC

Instructions: Do all of your calculations on this sheet. You have 25 minutes.
You can use the gold Derivative Reference sheet. Good luck.

1. Calculate these derivatives. Do NOT simplify once all the calculus is done. **Show your work.**
Draw a box around your final answer.

(3) (a) $\frac{d}{dx}(\ln(2 + 7x) \cdot e^{3x}) =$

(3) (b) $\frac{d}{dt}(\ln(t^3 + e^{2t})) =$

(3) (c) $\frac{d}{dx}(|2x|) =$

(3) (d) $\frac{d}{du}(3^{\sin(5u)}) =$

2. At time t seconds the weight on the spring is $h(t) = 7 + 5\sin(2\pi t)$ inches above the floor.

(1) (a) Find the velocity of the spring at time t : $v(t) =$ _____

(2) (b) Find the acceleration of the spring at time t : $a(t) =$ _____

3. An ant is crawling along a parabola so its position at time t is $A = (t, t^2 + 2)$. One end of a rubber band is tied to a tree at the point $(5, 2)$ and the ant is holding the other end. Write a formula for the length $L(t)$ of the rubber band at time t . (Don't bother to simplify the answer.)

(2) $L(t) =$

4. A small dog is running around a circle with radius 5 feet and center at the origin. The dog starts at the point $(5, 0)$, runs counterclockwise and makes 2 revolutions each minute. Write formulas for the x and y coordinates of the dog at time t minutes.

(2) $D = ($ _____ , _____)

5. At $t = 3$ minutes a balloon is at an elevation of 6000 feet and is rising at a rate of 250 ft/min. At 6000 feet the air temperature is 15° and decreases 0.02 degrees per each additional foot of elevation. How fast is the temperature of the air outside the balloon changing at $t = 3$ minutes?

(2) (include units with your answer) _____