Math 122B020F14 Quiz 2 October 2, 2014 Name: _____

1. The most recently estimated annual inflation rate for the U.S. is 1.6%. This means that on average, the price P of a good is increasing according to the function

$$P(t) = P_0(1.016)^t$$

where P_0 is the current price and t is in years. Suppose $P_0 = \$10$. Find and interpret $P'(1)$ (round to 3 decimal places).

2. Where is the function $g(y) = e^y - y^2$ concave up? You must give an exact answer using calculus.

3. Consider the piecewise function

$$f(x) = \begin{cases} x^2 & x \geq 0 \\ -x^2 & x < 0 \end{cases}$$

(a) Show that $f(x)$ is differentiable at 0 by computing $f'(0)$ *from the limit definition.* Hint: Consider $h > 0$ and $h < 0$ separately. No points will be awarded for using the power rule!

(b) Do you think $f''(0)$ exists? **Explain.** Hint: compute $f'(x)$ using the power rule for each 'piece'.