Part I (due at the beginning of class Thursday, October 16)

See what you can do (don't look it up; just try it yourself) toward using the definition of the derivative to prove the Constant Multiple Rule, the Product Rule, and the Quotient Rule for derivatives:

Suppose $f(x)$ and $g(x)$ are differentiable functions and c is a constant. Then

$$\frac{d}{dx}(c \cdot f(x)) = c \cdot f'(x),$$

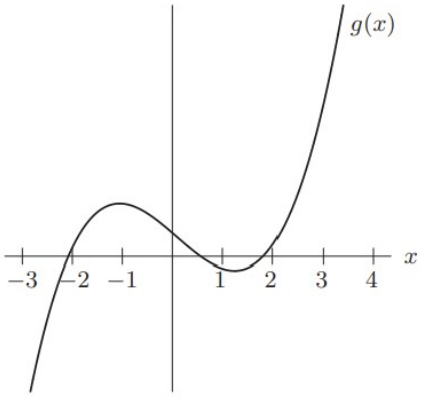
$$\frac{d}{dx}(f(x)g(x)) = f'(x)g(x) + f(x)g'(x),$$

and

$$\frac{f(x)}{g(x)} = \frac{f'(x)g(x) - f(x)g'(x)}{(g(x))^2}.$$

Part II: Problems (due at the beginning of class Tuesday, October 28)

1. For the function $g(x)$ shown in the graph below, arrange the following numbers in increasing order and explain your choices.
   (a) 0
   (b) $g'(2)$
   (c) $g'(0)$
   (d) $g'(1)$
   (e) $g'(3)$



2. An *odd* function is one for which $f(-x) = -f(x)$ for any x-value in the domain of $f(x)$.
   (a) Give an example of an odd function and explain how you know it's odd.
   (b) Suppose $g(x)$ is an odd function and $g(2) = 3$. What, if anything, can you say about $g'(2)$? Explain your answer.