- 3. (10 points) Suppose f'(x) is a differentiable increasing function for all x. In each of the following pairs, circle the larger value. In each case, give a **brief** reason for your choice. (Assume that none of the values below are equal for this function and  $\Delta x \neq 0$ ).
  - (a) f'(5) and f'(6)
  - (b) f''(5) and 0
  - (c)  $f(5 + \Delta x)$  and  $f(5) + f'(5)\Delta x$
- 4. (15 points) Using calculus, find constants a and b in the function  $f(x) = axe^{bx}$  such that  $f(\frac{1}{3}) = 1$  and the function has a local maximum at  $x = \frac{1}{3}$ . Once you have found a and b, verify that your answer satisfies the given conditions. Show all work.