3. (10 points) Suppose $f^{\prime}(x)$ 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) $f^{\prime}(5)$ and $f^{\prime}(6)$
(b)

$$
f^{\prime \prime}(5)
$$

and
0
(c) $f(5+\Delta x)$ and $f(5)+f^{\prime}(5) \Delta x$
4. (15 points) Using calculus, find constants $a$ and $b$ in the function $f(x)=a x e^{b x}$ such that $f\left(\frac{1}{3}\right)=1$ 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.

