(6.) (6 points) Let $f(x) = x^{3x}$. Use the **definition** of the derivative to express $f'(2)$ as a limit. You do not need to simplify your expression or try to estimate $f'(2)$.

(7.) (8 points) Suppose g is a differentiable function that satisfies the following three properties:

1. g is concave up.
2. $g(1) = 9$.
3. $g(5) = 3$.

(a) What is the average rate of change of g on the interval $[1, 5]$?

(b) Which is larger, $g'(2)$ or $g'(4)$? Explain.

(c) What is the maximum possible value for $g(3)$? (Hint: try sketching a graph of g.) Explain your reasoning.