8. [8 points]

    a. [3 points] Let

$$L(q) = \frac{\sin(q)}{1+3q}.$$

Suppose k is a nonzero constant. Write an explicit expression for the average rate of change of L between $q = 5$ and $q = 5 + k$.
Your answer should not involve the letter L. Do not attempt to simplify your expression.

Draw a box around your final answer.

Solution:

$$\frac{\dfrac{\sin(5+k)}{1+3(5+k)} - \dfrac{\sin(5)}{1+3\cdot 5}}{k}$$

    b. [5 points] Let

$$P(b) = (\ln(b))^{\tan(b)}.$$

Use the limit definition of the derivative to write an explicit expression for $P'(3)$.
Your answer should not involve the letter P. Do not attempt to evaluate or simplify the limit.

Draw a box around your final answer.

Solution:

$$\lim_{h\to 0} \frac{(\ln(3+h))^{\tan(3+h)} - (\ln(3))^{\tan(3)}}{h}$$