4. [9 points] Let \( P(v) = \begin{cases} \frac{v^2 \sin \left( \frac{1}{v} \right)}{\sin(2)} - v \sin(2) & \text{if } v \neq 0 \\ 0 & \text{if } v = 0. \end{cases} \)

\textbf{a. [5 points]} 
Use the limit definition of the derivative to write down an explicit expression for \( P'(0) \).
Your answer should not include the letter \( P \).
Do not attempt to evaluate or simplify the limit.

\[ P'(0) = \]

\textbf{b. [4 points]} Use your answer to (a) to estimate \( P'(0) \) to the nearest hundredth.
Be sure to include enough clear graphical or numerical evidence to justify your answer.

\textbf{Answer:} \( P'(0) \approx \)