## $\mathbf{E}^{\wedge} \mathbf{x}^{*} \cos (\mathbf{x})$ free response

AP Calculus

Give yourself 15 minutes to do this problem.

Let $f$ be the function defined by $f(x)=e^{x} \cos x$.
(a) Find the average rate of change of $f$ on the interval $0 \leq x \leq \pi$.
(b) What is the slope of the line tangent to the graph of $f$ at $x=\frac{3 \pi}{2}$ ?
(c) Find the absolute minimum value of $f$ on the interval $0 \leq x \leq 2 \pi$. Justify your answer.
(d) Let $g$ be a differentiable function such that $g\left(\frac{\pi}{2}\right)=0$. The graph of $g^{\prime}$, the derivative of $g$, is shown below. Find the value of $\lim _{x \rightarrow \pi / 2} \frac{f(x)}{g(x)}$ or state that it does not exist. Justify your answer.


