

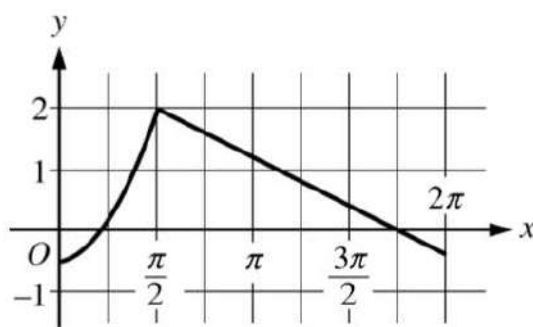
$E^x \cos(x)$ free response

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' , 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.



Graph of g'