

5. Let  $f$  be the function defined by  $f(x) = e^x \cos x$ .

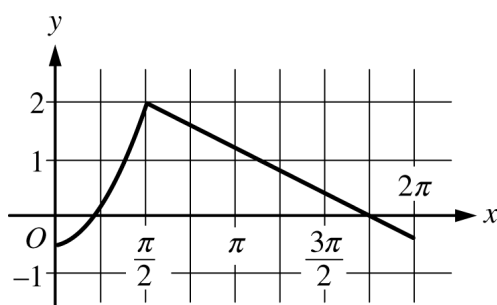
(a) Find the average rate of change of  $f$  on the interval  $0 \leq x \leq \pi$ .

(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  $g'$