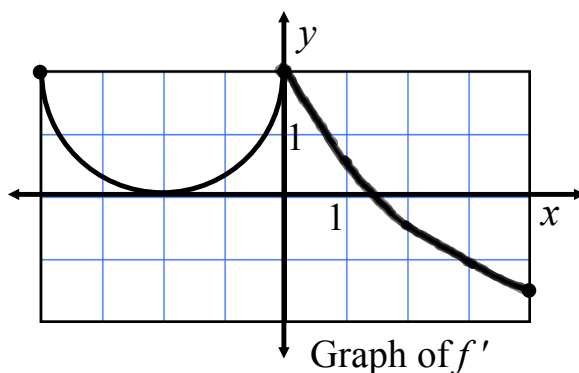


AP Test Question  
2009  
No Calculator Allowed



- 6) The derivative of a function  $f$  is defined by  $f'(x) = \begin{cases} g(x) & \text{for } -4 \leq x \leq 0 \\ 5e^{-\frac{x}{3}} - 3 & \text{for } 0 < x \leq 4 \end{cases}$

The graph of the continuous function  $f'$ , shown in the figure above, has  $y$ -intercepts at  $x = -2$  and  $x = 3 \ln\left(\frac{5}{3}\right)$ . The graph of  $g$  on  $-4 \leq x \leq 0$  is a semicircle, and  $f(0) = 5$ .

- a) For  $-4 < x < 4$ , find all values of  $x$  at which the graph of  $f$  has a point of inflection. Justify your answer.

- b) Find  $f(-4)$  and  $f(4)$ .

- c) For  $-4 \leq x \leq 4$ , find the value of  $x$  at which  $f$  has an absolute maximum. Justify your answer.