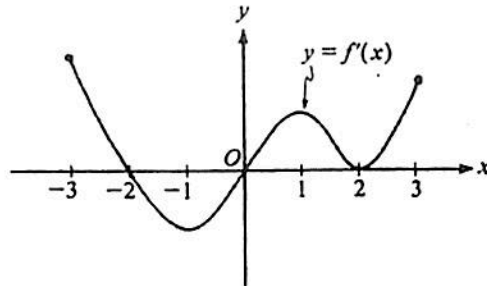


Name: \_\_\_\_\_  
AP Calculus AB: Analyzing Graphs

Date: \_\_\_\_\_  
Ms. Loughran

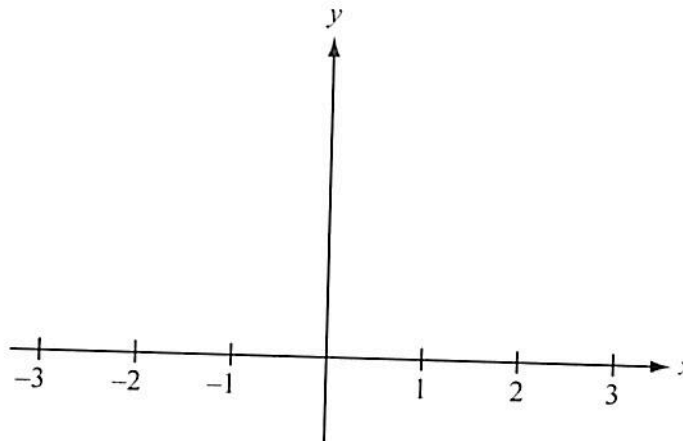
1985 AB 6

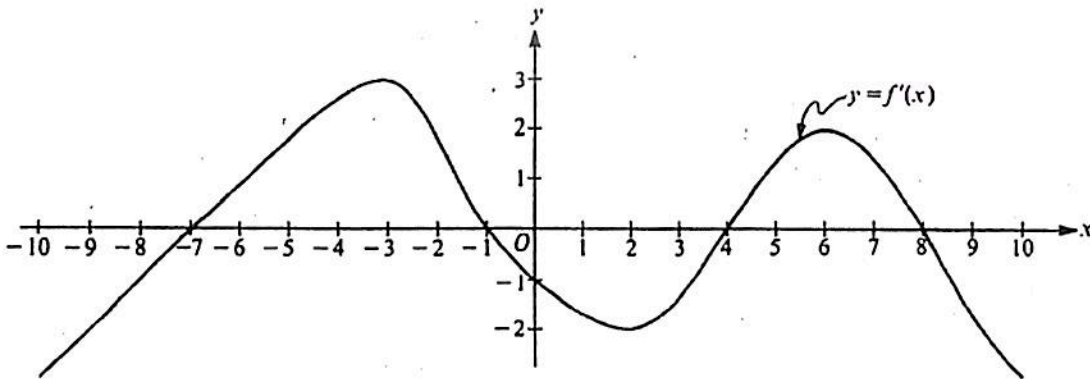


Note: This is the graph of the derivative of  $f$ , not the graph of  $f$ .

The figure above shows the graph of  $f'$ , the derivative of a function  $f$ . The domain of the function  $f$  is the set of all  $x$  such that  $-3 \leq x \leq 3$ .

- For what values of  $x$ ,  $-3 < x < 3$ , does  $f$  have a relative maximum? A relative minimum? Justify your answer.
- For what values of  $x$  is the graph of  $f$  concave up? Justify your answer.
- Use the information found in parts (a) and (b) and the fact that  $f(-3) = 0$  to sketch a possible graph of  $f$  on the axes provided below.



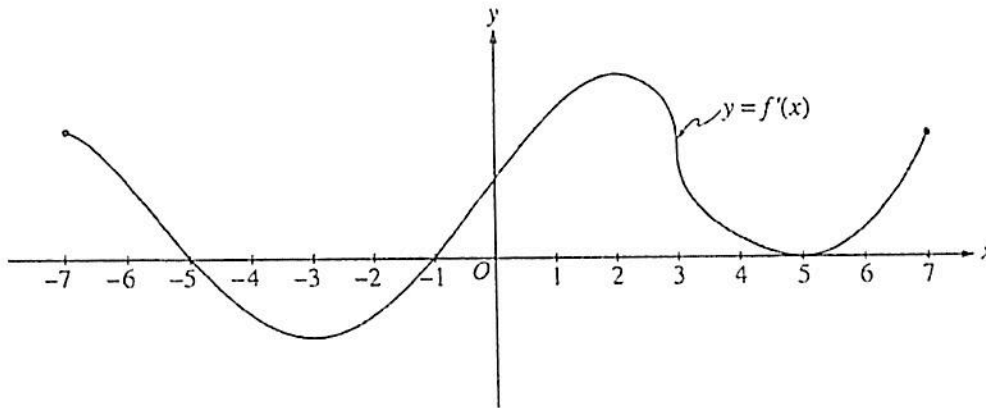


Note: This is the graph of the derivative of  $f$ , not the graph of  $f$ .

The figure above shows the graph of  $f'$ , the derivative of a function  $f$ . The domain of  $f$  is the set of all real numbers  $x$  such that  $-10 \leq x \leq 10$ ,

- For what values of  $x$  does the graph of  $f$  have a horizontal tangent?
- For what values of  $x$  in the interval  $(-10, 10)$  does  $f$  have a relative maximum?  
Justify your answer.
- For what values of  $x$  is the graph of  $f$  concave downward?

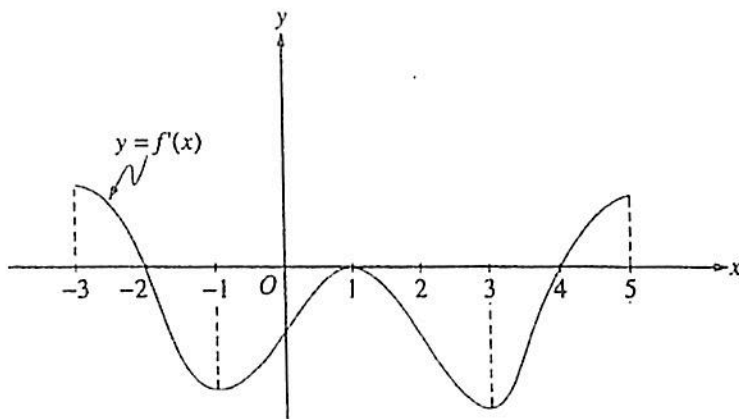
2000 AB 3



The figure above shows the graph of  $f'$ , the derivative of the function  $f$ , for  $-7 \leq x \leq 7$ . The graph of  $f'$  has horizontal tangent lines at  $x = -3$ ,  $x = 2$ , and  $x = 5$ , and a vertical tangent line at  $x = 3$ .

- Find all values of  $x$ , for  $-7 < x < 7$ , at which  $f$  attains a relative minimum. Justify your answer.
- Find all values of  $x$ , for  $-7 < x < 7$ , at which  $f$  attains a relative maximum. Justify your answer.
- Find all values of  $x$ , for  $-7 < x < 7$ , at which  $f''(x) < 0$ .
- At what value of  $x$ , for  $-7 \leq x \leq 7$ , does  $f$  attain its absolute maximum? Justify your answer.

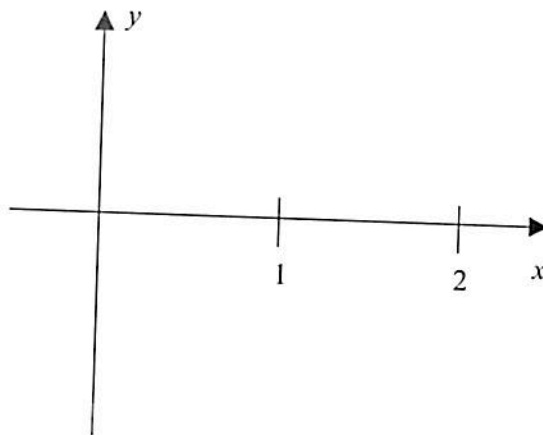
1996 AB 1



Note: This is the graph of the derivative of  $f$ , not the graph of  $f$ .

The figure above shows the graph of  $f'$ , the derivative of a function  $f$ . The domain of  $f$  is the set of all real numbers  $x$  such that  $-3 < x < 5$ .

- For what values of  $x$  does  $f$  have a relative maximum? Why?
- For what values of  $x$  does  $f$  have a relative minimum? Why?
- On what intervals is the graph of  $f$  concave upward? Use  $f'$  to justify your answer.
- Suppose that  $f(1) = 0$ . In the  $xy$ -plane provided, draw a sketch that shows the general shape of the graph of the function  $f$  on the open interval  $0 < x < 2$ .



1979 AB 3, BC 3

Find the maximum volume of a box that can be made by cutting out squares from the corners of an 8-inch by 15-inch rectangular sheet of cardboard and folding up the sides. Justify your answer.

Review Book Question

The graph of the **derivative** of  $f$  is shown in the figure.

- (a) Suppose that  $f(3) = 1$ . Find an equation of the line tangent to the graph of  $f$  at the point  $(3, 1)$ .
- (b) Where does  $f$  have a local minimum? Explain briefly.
- (c) Estimate  $f''(2)$ .
- (d) Where does  $f$  have an inflection point? Explain briefly.
- (e) Where does  $f$  achieve its maximum on the interval  $[1, 4]$ ?

