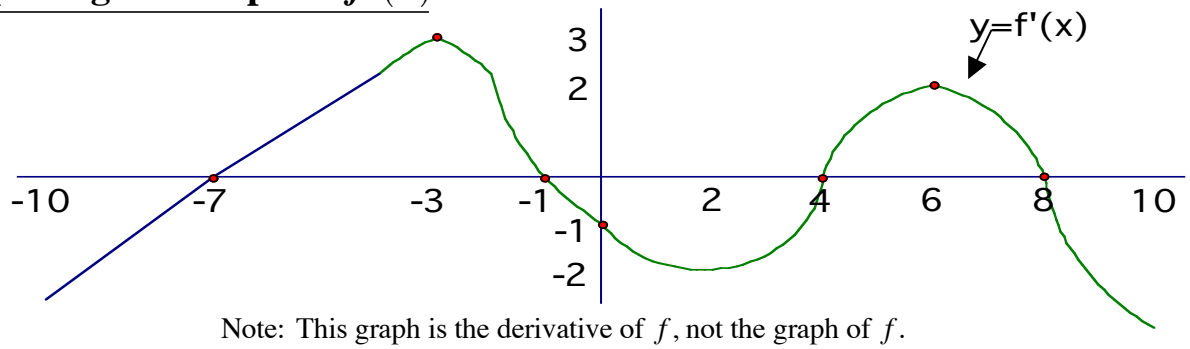
Interpreting the Graph of $f'(x)$



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

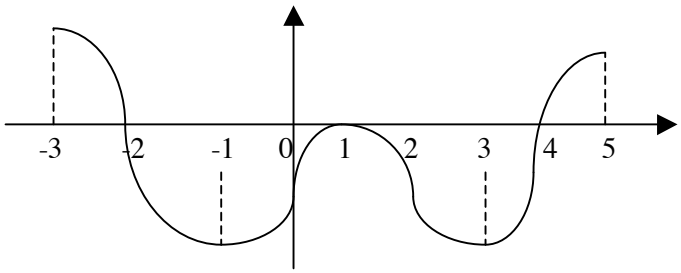
1989 (No Calculator)

5) 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 $-10 \le x \le 10$.

a) For what values of x does the graph of f have a horizontal tangent?

b) For what values of x in the interval $(-10, 10)$ does f have a relative maximum?

c) For what values of x is the graph of f concave downward?



1996 (No Calculator) Note: This is the graph of the derivative of f, not the graph of f.

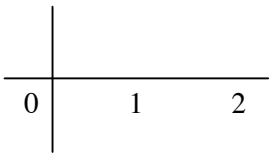
1) The figure above shows the graph of f', the derivative of a function f. The domain of f is the set of all real numbers x such that $-3 < x < 5$.

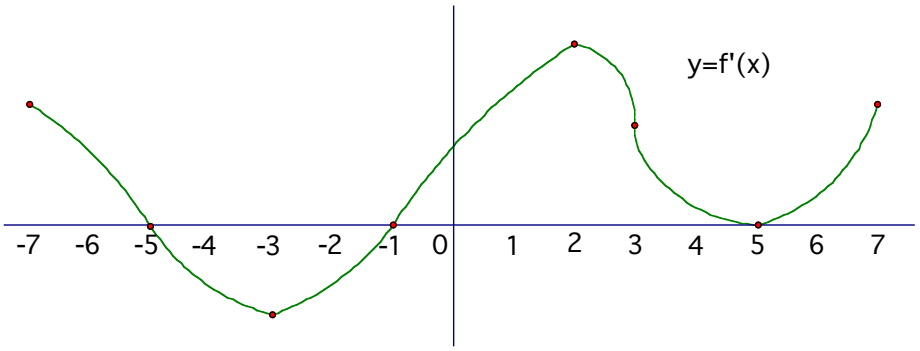
a) For what values of x does f have a relative maximum? Why?

b) For what values of x does f have a relative minimum? Why?

c) On what intervals is the graph of f concave upward? Use f' to justify your answer.

d) Suppose that $f(1) = 0$. In the xy-plane provided to the right, draw a sketch that shows the general shape of the graph of the function f on the open interval $0 < x < 2$.





2000 (Calculator)

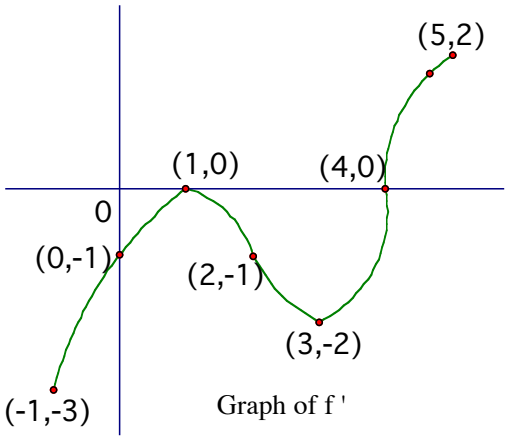
3) The figure above shows the graph of f', the derivative of the function f, for $-7 \le x \le 7$.
The graph of f' has horizontal tangent lines at $x = -3$, $x = 2$, $x = 5$ and a vertical tangent line at $x = 3$.

a) Find all values of x for $-7 < x < 7$, at which f attains a relative minimum. Justify your answer.

b) Find all values of x for $-7 < x < 7$, at which f attains a relative maximum. Justify your answer.

c) Find all values of x for $-7 < x < 7$, at which $f''(x) < 0$.

d) At what value of x, for $-7 \le x \le 7$ does f attain its absolute maximum? Justify your answer.



Graph of f '

2004 (Form B) (No Calculator)

4) The figure above shows the graph of f', the derivative of the function f, on the closed interval $-1 \le x \le 5$. The graph of f' has horizontal tangent lines at $x = 1$ and $x = 3$. The function f is twice differentiable with $f(2) = 6$.

a) Find the x-coordinate of each of the points of inflection of the graph of f. Give a reason for your answer.

b) At what value of x does f attain its absolute minimum value on the closed interval $-1 \le x \le 5$?
At what value of x does f attain its absolute maximum value on the closed interval $-1 \le x \le 5$?
Show the analysis that leads to your answers.

c) Let g be the function defined by $g(x) = x \cdot f(x)$. Find the equation for the line tangent to the graph of g at $x = 2$.