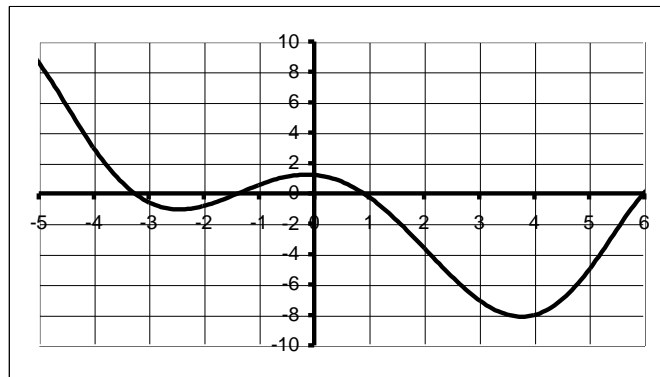1. A graph of $f'(x)$, the derivative of $f(x)$, is given below.

   a) On what interval(s) is $f(x)$ increasing? Decreasing? Explain.
   b) Determine where any relative extrema will occur. Justify your reasoning.

2. The graph at the right is the *derivative* of a function f.

   a) Find where f is increasing or decreasing. Justify your answer.
   b)   Find all relative maximum(s) or minimum(s). Justify your answer.
   c) If $f(-3)=2$, sketch a possible graph of f on the same axes.
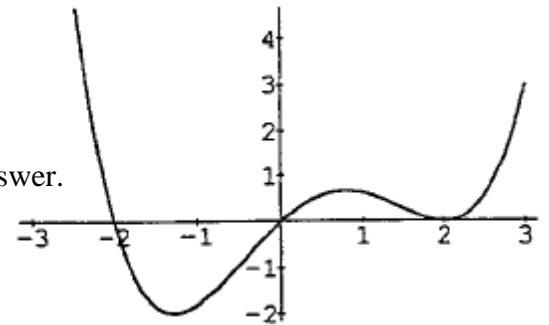
3. Sketch a graph of the function whose *derivative* satisfies the properties given in the table below.

| x	$(-\infty, -1)$	-1	$(-1, 1)$	1	$(1, 3)$	3	$(3, \infty)$
$f'(x)$	positive	0	negative	0	positive	0	negative

4. The accompanying figure shows the graph of the derivative of a function f. The domain of f is the closed interval $[-3,3]$.
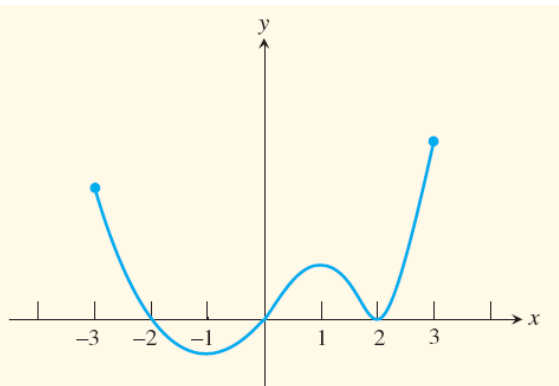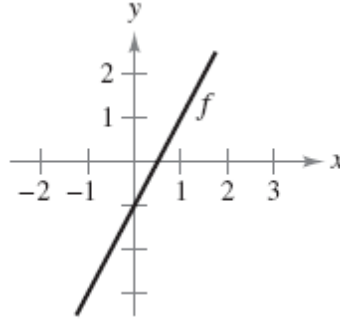

   a. Identify and classify the x-coordinate of each critical value. Justify your answers.
   b. Determine the interval(s) on which f is increasing. Justify.
   c. Determine the inverval(s) on which f is concave up and concave down. Justify your answers.

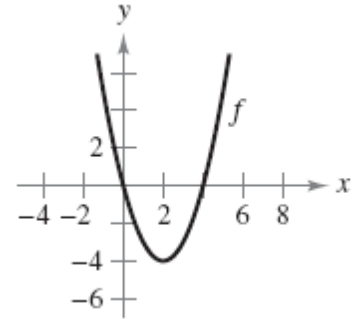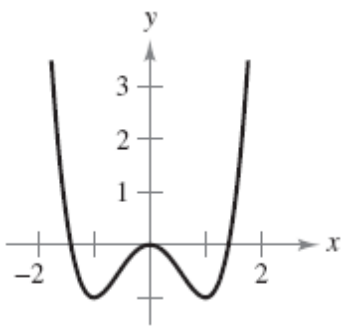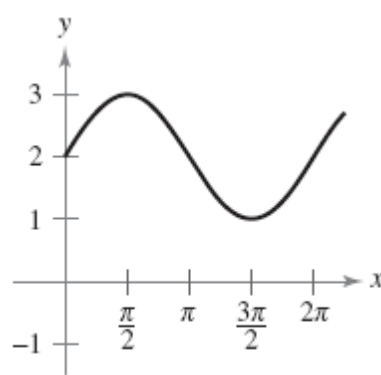**The graph of *f* is given below. Sketch a possible graph of *f* ' and *f* ".**
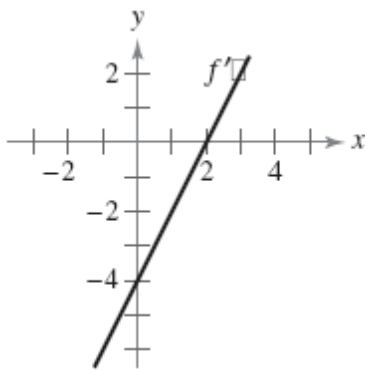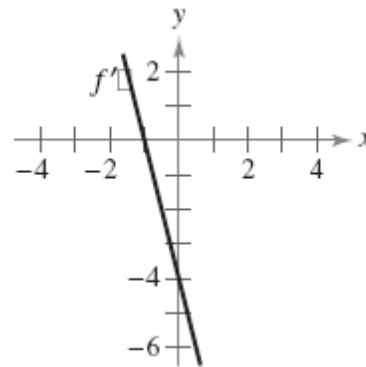
5.
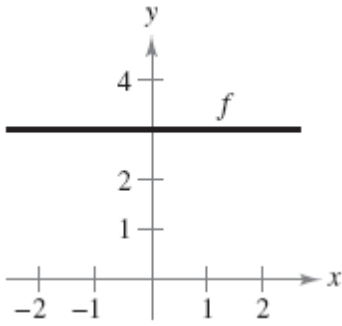
6.

7.

8.

9.

The graph of *f* ' is given below. Sketch a possible graph of *f*.

10.

11.

12.

13.