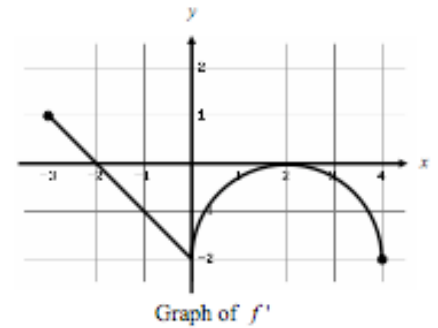
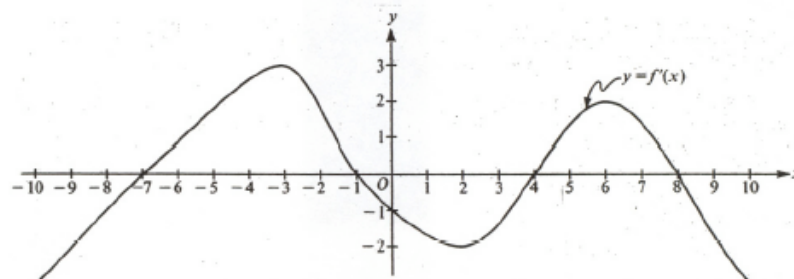


1. Let f be a function defined on the closed interval $-3 \leq x \leq 4$ with $f(0) = 3$. The graph of f' , the derivative of f , consists of one line segment and a semicircle, as shown below.

- (a) On what intervals, if any, is f increasing? Justify your answer.
- (b) Find the x -coordinate of each point of inflection of the graph of f on the open interval $-3 < x < 4$. Justify your answer.
- (c) Find an equation for the line tangent to the graph of f at the point $(0, 3)$



2.



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 $-10 \leq x \leq 10$.

- (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? Justify your answer.
- (c) For what values of x is the graph of f concave downward?

3. The graph of the derivative f' of a function f is shown below. The domain of f is the set of all real numbers x such that $0.5 \leq x \leq 3.5$. The graph of f' has horizontal tangent lines at $x = 1.4$ and $x = 2.6$.

- (a) What are the x -coordinates of the critical points of f ?
- (b) On what intervals, if any, is f increasing? Justify your answer.
- (c) At what values of x does f have a relative minimum?
- (d) State the x -coordinates of the points of inflection.
- (e) Assuming that f is continuous, and that $f(0.5) = 0$, sketch a possible graph of f .

