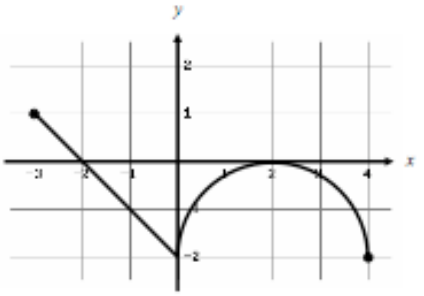
Name: _____ MA1 Mr. Shahom

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



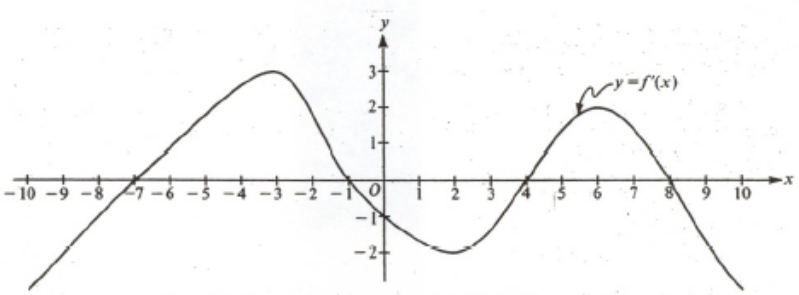
Graph of f'

(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.

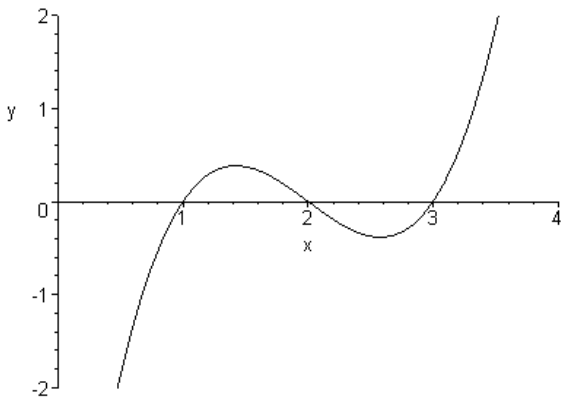
The figure above shows the graph of f', the derivative of a function f. The domain of f is the set of all real numbers x such that $-10 \le x \le 10$.

(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? 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 $0.5 \le x \le 3.5$. 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.