MAC2233 Quiz 3

Please write your answers to the following questions in the spaces provided. You must show your work to receive credit.

1. (9 points) Find the derivative of the function using the definition of the derivative.

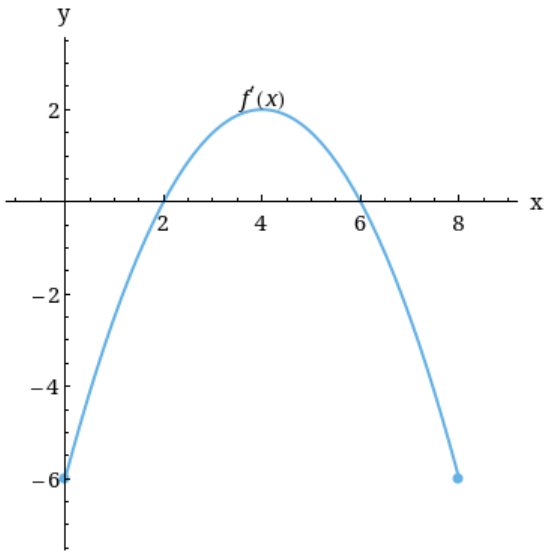
$$g(x) = \sqrt{5 + 6x}.$$

(a) $g'(x) =$

(b) What is the domain of $g(x)$?

(c) What is the domain of $g'(x)$?

2. (10 points) Consider the graph of the *derivative* f' of a function f is shown below.



(a) On what intervals is the function f increasing, and on what intervals is the function f decreasing? (Use interval notation).

(b) At what values of x does the function f have a local maximum, and at what values of x does the function f have a local minimum?

(c) Suppose that we know $f(0) = 0$. Using the information found in parts (a) and (b), sketch the graph of the function f.

(d) Based on your graph of f, on what intervals is $f''(x) > 0$ and on what intervals is $f''(x) < 0$?

3. (5 points) Find the points on the curve $y = 2x^3 + 3x^2 - 12x + 9$ where the tangent line is horizontal.

4. (9 points) Differentiate the following functions.

(a) $f(x) = (x-2)(x+4)$

(b) $g(x) = \frac{5x^2-2x+3}{x}$

(c) $h(x) = x^4 - 5e^x + 2x^2$.