1. (4 points) Let \( f(x) = 4x^3 - 5 \). Use the definition of a derivative as a limit to show that \( f'(x) = 12x^2 \). Show each step in your calculation and be sure to use proper terminology.
2. (3 points) Find the equation of the line tangent to the graph of \( f(x) = 3x^2 + 2x + 4 \) at the point \((1, 9)\). Write your answer in the form \( y = mx + b \). You may use any of the short-cut approaches discussed in section 3.1.

3. (3 points) Given the graph of \( f(x) \) shown below, sketch a graph of \( f'(x) \).