

Name \_\_\_\_\_

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  $f'(x)$ .