Show all work for credit. Also, give exact answers unless otherwise noted.

- 1. Let f be defined by $f(x) = 5 + 3x 4x^2$.
 - (a) Use the definition of the derivative to find f'(x).

- (b) Find the slope of the tangent line to the graph of f at (x, f(x)).
- (c) Find the slope of the tangent line to the graph of f at (3, -22).
- (d) Find the slope of the tangent line to the graph of f at (-2, -17).
- (e) Find the slope of the tangent line to the graph of f with x-coordinate 100.
- (f) Find the slope of the tangent line(s) to the graph of f with y-coordinate -5.
- (g) Find the point(s) on the graph of f at which the slope of the tangent line is 35.
- (h) Find the equation of the tangent line to the graph of f at the point whose x-coordinate is 1.

2. Let a function g be defined by g(x) = 2x² - 3x + 10. Given that g'(x) = 4x - 3, complete the following.
(a) Find the slope of the tangent line to the graph of g at (x, g(x)).

(b) Find
$$g'(3)$$
. (c) Find $g'(-2)$.

(d) Find g'(x) when g(x) = 15. (e) Find g(x) when g'(x) = 21.

(f) Find the slope of the tangent line to the graph of g at (3, 19).

- (g) Find the slope of the tangent line to the graph of g when the x-coordinate is -2.
- (h) Find the slope of the tangent line to the graph of g when the y-coordinate is 15.

(i) Find the point(s) on the graph of g at which the slope of the tangent line is 21.

(j) Find the equation of the tangent line to the graph of g at the point when the x-coordinate is -2.