Math 261 - Lab 8 **Introduction to Derivatives** **Name:** _____

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 $g(x) = 2x^2 - 3x + 10$. Given that $g'(x) = 4x - 3$, complete the following.

(a) Find the slope of the tangent ilne 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.