Math 229
Differentiation Worksheet
06/09/2008

Name:_____

1. Let $f(x) = 5 + 3x - 4x^2$.

   (a) Find the slope of the tangent line to the graph of f at $(x, f(x))$.

   (b) Find the slope of the tangent line to the graph of f at $(3, -22)$.

   (c) Find the slope of the tangent line to the graph of f at the point(s) with y-coordinate -5.

   (d) Find the point(s) on the graph of f at which the slope of the tangent line is 35.

   (e) Find the equation of the tangent line to the graph of f at the point whose x-coordinate is 1.

   (f) Find the equation of the tangent line to the graph of f at the point whose x-coordinate is -2.

2. Find the derivative of each of the following functions. Simplify your answers completely.

(a) $f(x) = 2x^5 - 4x^3 + \frac{2}{3}x^3 + 15x^2 - 3x + 10$

(b) $f(x) = 4x^5 - \pi x^3 + \pi^3 x - \sqrt{2}$

(c) $f(x) = 2\pi$

(d) $f(x) = 2x^{\frac{5}{3}} - x^{\frac{4}{3}} - \dfrac{3}{x}$

(e) $f(x) = (x^4 + x^3 + x^2 + x + 1)(x - 1)$

(f) $f(x) = \dfrac{5x^4 - 3x^2 + 7}{x^2}$

(g) $f(x) = \dfrac{x^2 - 4}{3x + 6}$

(h) $f(x) = (x^{\frac{5}{3}} - 3x)(7 - x^{\frac{3}{2}})$

(i) $f(x) = \sqrt{x^2 + 1}$

(j) $f(x) = (4x^3 - 5x + 17)^{12}$

(k) $f(x) = (3x^2 - 5)^7(x^2 + 5x - 7)^{10}$