PRACTICE II

1. Use the definition of a derivative to find $f'(1)$ for $f(x) = \frac{1}{x+1}$. Find the tangent line for f at $x = 1$

2. Suppose $f(x) = \sqrt{2x-1}$. Using the limit definition of a derivative, calculate $f'(5)$. Find the tangent line for f at $x = 5$

3. Calculate the derivatives of the following functions:

(a) $f(x) = e^{\sin(5x)}$

(b) $f(x) = \ln(x^3 - 2\sqrt{x})$

(c) $f(x) = \sin(\cos^2 x + 1)$

4. In the following assume that x, y, z are all functions of t. Given $x = 4$, $y = -2$, $z = 1$, $x' = 9$ and $y' = -3$ determine z' for the following equation:

$$x(1 - y) + 5z^3 = y^2z^2 + x^2 - 3$$

5. A thin sheet of ice is in the form of a circle. If the ice is melting in such a way that the area of the sheet is decreasing at a rate of 0.5 m^2/s at what rate is the radius decreasing when the area of the sheet is 12 m^2?