Math 30

Practice for Exam 2

1. A square is inscribed in a circle (that is, the square is inside with its corners touching the circle). If the radius of the circle is increasing at a rate of 3 cm/min, determine how fast the area of the square is increasing when the radius is 10 cm.

2. Evaluate the limit:

$$\lim_{x\to\infty}[\frac{1}{2}\ln(3x^2+4)-\ln(4+3x)]$$

3. Find the derivative of $y=(\tan(x))^{\frac{1}{x}}$.

4. Find the equation of the tangent line to the curve $xe^{2y}+ye^{2x}=3$ at the point $(0,3)$.

5. A bacteria culture contains 200 cells initially and grows at a rate proportional to its size. After half an hour the population has increased to 360 cells. When will the population reach 10,000?

6. Find the inverse of

$$f(x)=\frac{1+e^x}{1-e^x}$$

7. Let $f(x)=\sqrt{x^3+x^2+x+1}$. Find $(f^{-1})'(2)$.