Exam 3 A. Miller Spring 97 Math 221

5 points per problem.
Show all work and explain your answer.
A correct answer with no explanation
will receive 0 credit.

1. Find $\lim_{x\to\infty} \frac{e^{2x}}{e^{2x}+1}$.

2. If $f(x) = 2x + \cos(x)$ and $g = f^{-1}$, find $g'(1)$.

3. Find $\lim_{x\to 0} \log_{10}(\tan^2(x))$.

4. Let $f(x) = 10^{x^2}$. Find $f'(x)$.

5. Suppose that an object takes 40 minutes to cool from 30 degrees to 24 in a room that is kept at 20 degrees. What was the temperature of the object 15 minutes after it was 30 degrees?

6. Find $\frac{d}{dx} \sin^{-1}(x^2 - 1)$.

7. Find $\lim_{x\to 0} \frac{\tan(x)-x}{x^3}$.

Answers

1. 1 see page 200.
2. $\frac{1}{2}$ see page 207.
3. $-\infty$ see page 210.
4. $(2 \ln 10) x 10^{x^2}$ see page 218.
5. $20 + 10e^{\frac{3}{8} \ln(\frac{2}{5})}$ see pages 224-225.
6. $\frac{2x}{\sqrt{1-(x^2-1)^2}}$ see page 230.
7. $\frac{1}{3}$ see pages 243-244.