Quiz # 5 for MA 113 - Calculus I (Spring 08)
9 October 2008

This quiz is intended to help you prepare for the exams. Thus, you should attempt all questions and write their answers (including your explanations) in the space provided.
This quiz will not be collected or graded.

1. Using the "chain" and "product" rules, find \( \frac{d}{d\theta} [e^{2\theta} \cdot \sin(3\theta - 1)] \).

\[
\frac{d}{d\theta} \left( e^{2\theta} \sin(3\theta - 1) \right) = \left( \frac{d}{d\theta} e^{2\theta} \right) \cdot \sin(3\theta - 1) + e^{2\theta} \frac{d}{d\theta} \left( \sin(3\theta - 1) \right)
\]
\[
= 2e^{2\theta} \sin(3\theta - 1) + e^{2\theta} \cdot 3\cos(3\theta - 1)
\]

2. Using implicit differentiation, find \( \frac{dy}{dx} \) when \( \frac{x^2}{3} - \frac{y^2}{4} = 5xy \).

\[
\frac{x^2}{3} - \frac{y^2}{4} = 5xy
\]
\[
\frac{2}{3}x - \frac{2}{4}y \frac{dy}{dx} = 5y + 5x \frac{dy}{dx}
\]
\[
\frac{2}{3}x - 5y = (5x + \frac{1}{2}y) \frac{dy}{dx}
\]
\[
\frac{dy}{dx} = \frac{\frac{2}{3}x - 5y}{5x + \frac{1}{2}y}
\]

Optional

\[
\frac{dy}{dx} = \frac{2x - 15y}{15x + \frac{3}{2}y} = \frac{4x - 30y}{30x + 3y}
\]