COMPUTER PROJECT #1

Math 316
Autumn 1997

Please enter your name and student ID number.

NAME: ______________________________

STUDENT ID #: ______________________

Consider the differential equation

$$\frac{dy}{dx} = -\frac{x^2 - \sin x}{4y^2 \cos y}.$$

1. Solve the differential equation.

2. Use **contourplot** to show what the solution curves look like. Plot the solution curves for $-4 \le x \le 4$ and $-4 \le y \le 4$.

3. Use **implicitplot** to plot the solution curves satisfying the initial conditions $y(-2) = -2$ and $y(0) = -2$.

4. Use **DEplot** to plot the vector field over the ranges $-4 \le x \le 4$ and $-4 \le y \le 4$. Include in this plot the solution curves with the same initial conditions as in Part 3. Do these curves look the same as in Part 3? If not, why not?

Hand in a print out of your complete computer algebra solution. Cut all sheets down to $8\frac{1}{2}$ by 11 inches and staple in the upper left-hand corner.

Note: See the book *Differential Equations wtih Maple*, by K. Coombes *et al*, for help with this project.