Calculus I
Exam 2, Spring 2003

WARNING: You must show work, particularly where graphing is involved.

1. A curve in the first quadrant is given implicitly by the equation

$$x^2y^2 + \frac{x}{y} = 66 \, .$$

Find the slope of the tangent line to the curve at the point (4,2).

2. Two variables u and v are functions of time, related by the equation

$$5u^2 + uv - 210 = 0 \, .$$

If $dv/dt = 3$ when $u = 6$ and $v = 5$, find du/dt.

3. Find the minimum value of the function $f(x) = \dfrac{x^2+1}{x^2+3}$.

4. Farmer Brown is building a rectangular chicken coop with one side against his barn. He will enclose the other three sides with chain link fence, but he will also build a chain link partition which is perpendicular to the barn. If the total area to be enclosed is 600 square feet, what should the dimensions be to minimize the amount of fence needed?

5. Graph $y = \dfrac{x^2}{(x+1)(x-1)}$, clearly indicating all asymptotes and local maxima and minima.