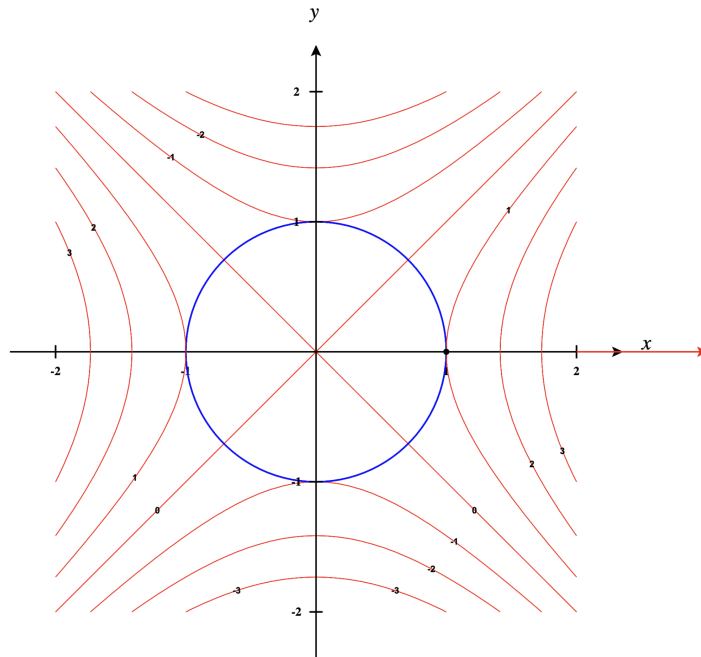


Math 203 — Lagrange Multipliers

Problem 1. Find the absolute minima and maxima of $f(x, y) = x^2 - y^2$ subject to the constraint $x^2 + y^2 = 1$. You might find the contour diagram below helpful in checking your answer.



Problem 2. A manufacturer of golf balls has created a model (ie. a function)

$$f(x, y) = 48x + 96y - x^2 - 2xy - 9y^2$$

which outputs the profit of monthly sales (in thousands of dollars), given x golf balls sold per month (in thousands) and y hours per month of advertising. Every thousand golf balls cost \$20 (thousand dollars) to produce and every hour of advertising costs \$4 (thousand dollars). Find values of x and y that maximize profit subject to the constraint that there is a fixed budget of \$216 thousand dollars.

Problem 3. Find the dimensions of a rectangular region with largest area, subject to the constraint that its perimeter be 10 meters.