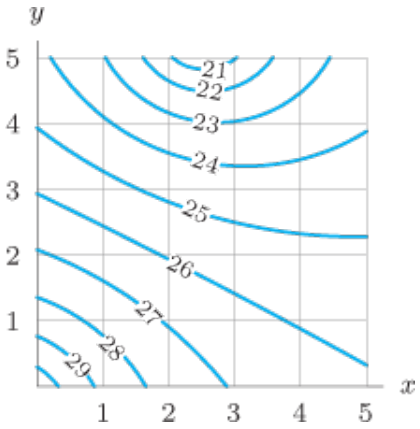
15.2 Optimization

Name: Date:

P 3. Estimate the position and approximate value of the global maxima and minima on the region below.



P 7. Find the global maximum and minimum of $z = x^2 - y^2$ on $-1 \leq x \leq 1$, $-1 \leq y \leq 1$, and say whether it occurs on the boundary of the square.

P 9. Does the function $g(x, y) = x^2y^2$ have a global maxima and minima in the xy-plane?

P 18. Design a rectangular milk carton box of width w, length l, and height h which holds 512 cm^3 of milk. The sides of the box cost 1 cent/cm^2 and the top and bottom cost 2 cent/cm^2. Find the dimesnions of the box that minimize the total cost of materials used.

P 30. Let $f(x, y) = 2/x + 3/y + 4x + 5y$ in the region R where $x, y > 0$.

(a) Explain why f must have a global minimum at some point in R.

(b) Find the global minimum.

P 33. Explain what is wrong with the statement: 'A function having no critical points in a region R cannot have a global maximum in the region.'

P 34. No continuous function has a global minimum on an unbounded region R.

P 35. If $f(x, y)$ has a local maximum value of 1 at the origin, then the global maximum is 1.