

## Math 203 — Global optimization

---

**Problem 1.** The sum of the *length*  $x$  and *girth*  $g$  of a rectangular box cannot exceed 130 inches. The *girth* of a box is defined to be twice the sum of its *width*  $w$  and *height*  $y$ . Assume you want to make a box with equal width and height. Find the maximum possible volume of such a box under the given constraints.

**Problem 2.** Find the maximum volume of a cylindrical soda can such that the sum of its height and circumference is 120 centimeters.

**Problem 3.** Let  $f(x, y) = x^2 - 2xy + 4y^2 - 4x + 24$ . Find the global extrema of  $f$  on the domain whose boundary is given by the triangle with vertices  $(0, 0)$ ,  $(4, 0)$ , and  $(4, 2)$ .