
21-120: Differential and Integral Calculus
Recitation #18 Outline: 10/31/24

1. Show that among all rectangles with a given perimeter, the one with the largest area is a square.
2. Claudia the cow is 1 mile north of the x-axis river which runs east to west. Her barn is 3 miles east and 1 mile north of her current position. She wishes to drink from the river and then walk to her barn so as to minimize her total amount of walking. Where on the river should she stop to drink?
3. A box without a lid is to be constructed from a rectangular metal sheet by cutting out equal squares from each corner and folding the edges up. Find the dimensions of the box with the largest volume that can be constructed in this way if the sides of the rectangular sheet measure:
a) 10 cm by 10 cm. b) 12 cm by 18 cm.
4. Calculate the dimensions (radius and height) of a cylindrical can with a capacity of one liter, whose total surface area is minimized.