

## 15.1–2: Optimization

### Calculus III

College of the Atlantic

1. Consider the function  $f(x) = 1/x + 1/y + xy$ .
  - (a) Use calculus and algebra to find any critical points.
  - (b) By graphing the function and using common sense/critical thinking, classify any critical points.
  - (c) Graph a close-up of the function near any critical points you found. What do the contour lines look like?
  - (d) Graph a close-up of the function near  $x = 2$ ,  $y = 3$ . What does the graph look like? What do the contour lines look like?
  
2. (Example 2 from Chapter 15.2, slightly modified.) Twenty cubic meters of tofu are to be delivered to College of the Atlantic. The tofu-maker plans to purchase an open-top box in which to transport the tofu in numerous trips. The total cost is the cost of the box plus \$2 per trip—perhaps this is bio-diesel needed to fuel her truck. The box must have a height of 0.5 meters but the tofu-maker can choose the length and the width. The cost of the box is \$20/m<sup>2</sup> for the ends and \$10/m<sup>2</sup> for the bottom and sides. What size box should the trucker buy to minimize the total cost?