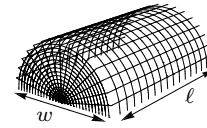


1. [15 points] A hoophouse is an unheated greenhouse used to grow certain types of vegetables during the harsh Michigan winter. A typical hoophouse has a semi-cylindrical roof with a semi-circular wall on each end (see figure to the right). The growing area of the hoophouse is the rectangle of length ℓ and width w (each measured in feet) which is covered by the hoophouse. The cost of the semi-circular walls is \$0.50 per square foot and the cost of the roof, which varies with the side length ℓ , is $\$1 + 0.001\ell$ per square foot.



- a. [4 points] Write an equation for the cost of a hoophouse in terms of ℓ and w . (*Hint: The surface area of a cylinder of height ℓ and radius r , not including the circles on each end, is $A = 2\pi r\ell$.*)
- b. [11 points] Find the dimensions of the least expensive hoophouse with 8000 square feet of growing area.