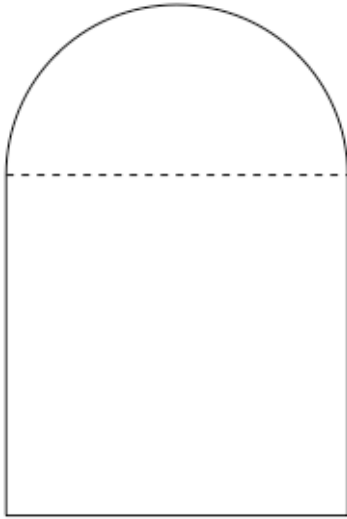


3.4: Applied Optimization Worksheet

1. A Norman window has the shape of a rectangle with a semicircle on top:



A Norman window needs to have a perimeter of 20 feet. Find its dimensions if it should let in a maximum amount of light (i.e. enclose maximal area).

AC 3.4.6. A rectangular box with a square bottom and closed top is to be made from two materials. The material for the side costs \$1.50 per square foot and the material for the top and bottom costs \$3.00 per square foot. If you are willing to spend \$15 on the box, what is the largest volume it can contain? Justify your answer completely using calculus.

AC 3.4.9. A company is designing propane tanks that are cylindrical with hemispherical ends. Assume that the company wants tanks that will hold 1000 cubic feet of gas, and that the ends are more expensive to make, costing \$5 per square foot, while the cylindrical barrel between the ends costs \$2 per square foot. Use calculus to determine the minimum cost to construct such a tank.

(Surface area of a sphere: $4 \pi r^2$)