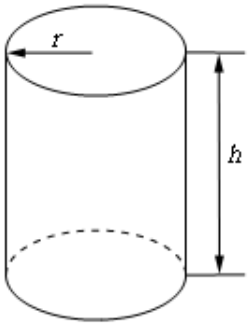
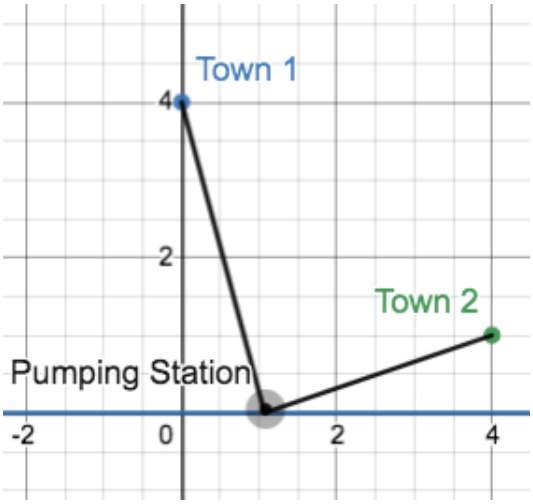
Name: _____

4.3 Optimization Part 2

1. A manufacturer needs to make a cylindrical can that will hold 1.5 liters of liquid. Determine the dimensions of the can that will minimize the amount of material used in its construction. Note that 1 Liter = 1000 cm^3 and so we can convert 1.5 liters into 1500 cm^3. The volume of a cylinder is $V = \pi r^2 h$ and surface area of cylinder is $A = 2\pi rh + 2\pi r^2$ (see digaram below).



2. On the same side of a straight river are two towns, and both towns want to build a pumping station S. Where should the pumping station be located to minimize the TOTAL length of pipe used to connect each town to the pumping station?



3. A rectangle as one vertex on the origin and the other on the curve $y = e^{-2x}$. Estimate the maximum area of the rectangle.

4. The product of two nonnegative numbers is 144. What is the minimum value of their sum?