Problem statement A right circular cone has vertex down and is 10 feet tall with base radius 5 feet. The cone is filled with a fluid having varying density. The density varies linearly with distance to the top. Here "varies linearly" means the quantities are related by an equation of at most degree 1. At the top of the cone, the density is 80 lbs/ft^3, and at the bottom the density is 120 lbs/ft^3. How much work in ft-lbs is needed to pump out all the fluid to the top of the cone?

Oblique and sideways views of the cone are shown to the right.