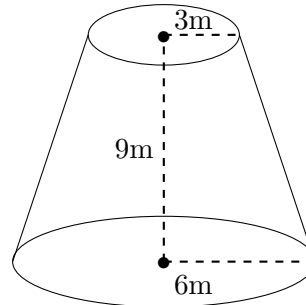


9. [12 points] The Nub's Nob Ski Area keeps a massive supply of hot chocolate. The hot chocolate is stored in a container shaped like a cone with the point end removed as shown below. The height of the container is 9 meters, and it has lower radius 6 meters and upper radius 3 meters. The hot chocolate has a density of 3000 kg/m^3 . Recall the gravitational constant is $g = 9.8 \text{ m/s}^2$.



- a. [3 points] Write a formula for $r(h)$, the radius of a circular cross section of the container h meters above the base.
- b. [6 points] Write a formula in terms of $r(h)$ for the work required to lift a slice of hot chocolate of thickness Δh from height h to the top of the container.
- c. [3 points] Write an integral that gives the work required to lift all of the hot chocolate to the top of the container. Do not evaluate this integral.