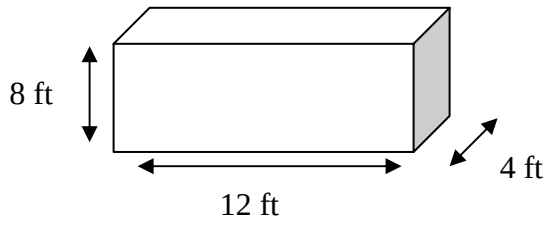
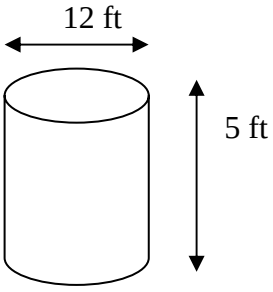
SET UP THE INTEGRALS NEEDED TO SOLVE EACH OF THE PROBLEMS BELOW. INCLUDE AN ILLUSTRATION OF THE VARIABLE.

1. A tank contains 288 ft^3 of water. If the density of water is 62.4 lbs/ft^3, how much work is needed to pump all of the water out of the tank? How would your integral change if the tank is on one of its other sides? Which position would produce the greatest amount of work?

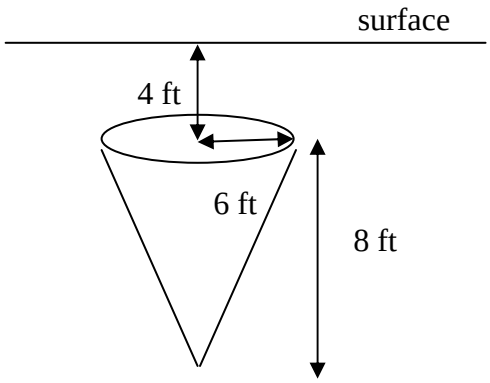


2. A tank is full of water. How much work is needed to pump all of the water out of the tank to a point 3 feet above the tank? How would your integral change if the tank is on its side?



3. A conical tank filled with kerosene is buried 4 feet underground. The density of kerosene is 51.2 lbs/ft^3. The kerosene is pumped out until the level drops 5 feet. How much work is needed to pump the kerosene to the surface if the variable is given as

A. The distance between the vertex of the cone and the "slice"?
B. The distance between the top of the cone and the "slice"?
C. The distance between the surface and the "slice"?
D. The distance between the final level of the kerosene and the "slice"?



4. A chain is L feet long and weighs W pounds. How much work is needed to pull the chain to the top of a bridge that is $L+5$ feet tall?

5. A block of ice weighing 500 pounds will be lifted to the top of a 200 foot building. In the 20 minutes it will take to do this, the block will lose 12 pounds. How much work is needed to lift the block of ice to the top of the building?

6. A banner in the shape of an isosceles triangle is hung over the side of a building. The banner has a base of 25 feet (at the roof line), a height of 20 feet, and weighs 40 pounds. How much work is needed to lift the banner onto the roof of the building?