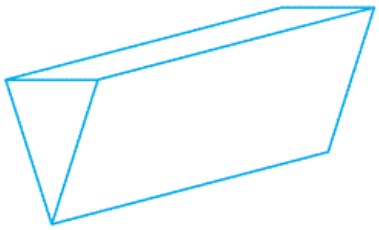
Name _____

Homework 11
Section 8.5

1. (5) Jack is raising a pail of water from a well. The full pail of water initially weighs 25 pounds; Unfortunately, the pail has a hole in it and water is dripping out at a constant rate of $\frac{1}{4}$lb for each foot that the pail is raised. If Jack is using a rope which weighs $\frac{1}{2}$lb/ft, how much work is required for Jack to pull the pail to the top of the well, which is 20 feet deep?

2. (5) A water trough has a face which is an isosceles triangle with base 4 feet and height 3 feet. The trough is 15 feet long and is filled with a liquid whose density h feet above the bottom is given by $\delta(h) = 70 - 4h$ lb/ft^3. How much work is required to pump all of the liquid over the top of the tank?



3. (5) A gas station is going to construct an underground tank in the shape of the top half of a sphere of radius 8 ft. The tank will be buried so that the top is 12 feet below ground level (a cross section is shown below). Find the amount of work required to pump a full tank of gas out of the tank. (Gasoline weighs 42 lb/ft^3.)

4. (5) Just before construction of the new tank begins, a worker notices that perhaps it would be better to build the tank upsidedown of what was planned. That is, to build it as the *bottom* half of a sphere. How much work is required to pump out a full tank of gas in this new configuration?