## **Review Problems**

February 1, 2017

- 1. (Fall 2006, Exam 1, #9) A conical tank T is h meters high and the radius of its base is R meters long. The base of tank T rests on the ground. If the tank is filled with a liquid of density  $\rho \text{ Kg/m}^3$ , find the work necessary to empty it by pumping the liquid through its top (use g for the acceleration of gravity).
- 2. (Fall 2007, Exam 1, #10) A cubic tank whose sides are 1 m long sits on the ground ad is filled with a liquid of density 100 Kg/m<sup>3</sup>. If we take the acceleration of gravity  $g = 10 \text{ m/s}^2$ , find the necessary work to empty the tank by pumping the liquid through its top in Joules.
- 3. (Fall 2008, Exam 1, #9) A 5-lb cable is 10 feet long and hangs vertically from the top of a 30 ft tall wall. How much work is required to lift the cable to the top of the wall?
- 4. (Fall 2009, Exam 1, #10) A spring has a natural length of 12 inches. It takes 4 lb. to stretch the spring 6 inches. How much work is needed to stretch the spring from a length of 18 inches to a length of 24 inches?
- 5. (Fall 2010, Exam 1, #11) A tank in the shape of a cube with sides 2 meters long is full of a liquid having density 1 kg/m<sup>3</sup>. Find the work required to empty the tank by pumping all of the liquid to the top of the tank. (Use  $g = 10m/s^2$ .)