Practice on Work

1) If the work required to stretch a spring 1 ft beyond its natural length is 12 ft-lb, how much work is needed to stretch it 9 in. beyond its natural length?

2) A tank has the shape of an inverted circular cone with height 10 m and base radius 4m. It is filled with water to a height of 8 m. Find the work required to empty the tank by pumping all of the water to the top of the tank. (The density of the water is 1000 kg/m^3)

3) A heavy rope, 50 ft long, weighs 0.5 lb/ft and hangs over the edge of a building 120 ft high. How much work is done in pulling the rope to the top of the building? Can you find this work without performing any integration?

4) Use Newton's law of gravitation to compute the work required to lift a 2000-lb satellite to an orbit 600 miles from the earth. (Take the radius of earth to be 4000 miles)