In-Class Assignment 4: Work

MATH 142

Directions: Work neatly on a separate sheet of paper. Your group will hand in one write-up with everyone's name on it. **DO NOT** fold the corner over to hold everything together!

Work together on each problem; do not delegate different problems to different people.

1. Suppose a force of 10N is required to stretch a spring 0.1m from equilibrium. How much work is needed to stretch the spring a further 0.25m?
2. How much work is required to pump all the water out of a cylindrical tank with a height of 10m and a radius of 5m? The water is pumped to an outflow pipe 15m above the bottom of the tank and the tank begins full.
3. A 30-m-long chain hangs vertically from a cylinder attached to a winch. Assume there is no friction and the chain has a density of 5kg/m.
   (a) How much work is required to wind the entire chain onto the cylinder using the winch?
   (b) How much is required if there is also a 50kg block attached to the end of the chain?