Math 101 – WORKSHEET 19
MORE WORK

(1) (Preliminary) A worker carries a 20kg bucket to the top of a 10m tall building. Half way up the worker picks up a second 20kg bucket. Calculate the total work done by the worker by adding the contributions from carrying each bucket separately.

(2) (Quiz, 2015) A10m-long cable of mass 7kg is used to lift a bucket off the ground. How much work is needed to raise the entire cable to the height of 10m? Ignore the weight of the bucket, and use $g = 9.8 \mathrm{m/sec^2}$ for the acceleration due to gravity.

(3) (Final, 2012) A tank in the shape of a hemispherical bowl of radius $R = 3$m is full of water. It is to be emptied through an outlet extending $H = 2$m above its top. Using the values $\rho = 1000$kg/m^3 for the density of water and $g = 9.8$m/s^2 for the acceleration due to gravity, find the work (in Joules) required to empty the tank completely. There is no need to simplify your answer but you must evaluate all integrals.

(4) (Final, 2010) A colony of ants builds an anthill that is in the shape of a cone whose base, at ground level, is a circle of diameter 1ft and whose height is also 1ft. How much total work, in ftlb$s$, is done by the ants in building the anthill? For the density of sand, use the value 150lb/ft^3.