MATH 129-020
SOME WORD PROBLEMS

SPRING 2019

(1) A force of 2 Newtons moves an object 12 meters. How much work is done?

(2) A 3 pound force moves an object 4 feet. How much work is done?

(3) Hooke's Law dictates that the force F required to compress a spring by a distance x (in meters) is given by $F(x) = kx$ for some constant k. (Here the constant k depends on the material properties of the spring.) Find the work done in compressing the spring 0.1 meters if $k = 8$ N/m.

(4) How much work is done to lift a 1.5 kg book 2 meters off the floor?

(5) How much work is done to lift a 5 pound book 3 feet off the floor?

(6) A 28 meter chain with a uniform mass of 2kg per meter is hanging from the roof of a tall building. How much work is required to pull the chain to the top of the building?

(7) Oil is in a cone shaped tank (see figure). If the oil has a density of 800 kg/m^3, find the work done to pump the oil to the rim of the tank.

(8) There is water in a vertical cylinder of height 8 feet and radius 4 feet. If the water has density 62.4 pounds per cubic foot, find the work associated to:

a) Pumping the water to the top, if the tank is full.

b) Pumping the water two feet above the top, if the tank is full.

c) Pumping the water to the top, if the tank only has 5 feet of water in it.

(9) It is claimed that the Great Pyramid of Egypt was built in 20 years. If the stone making up the pyramid has a density of 200 pounds per cubic foot, find the total work done in building the pyramid. The pyramid is 410 feet high and has a square base which is 755 feet by 755 feet.

(10) A worker on a scaffolding 70 feet above the ground needs to lift a 330 pound bucket of cement from the ground to a point 35 feet above the ground. If he uses a rope weighing 5 pounds per foot, how much work is required?

(11) In 1912, the ocean liner Titanic sank to the bottom of the Atlantic, nearly 12,500 feet (or 2.5 miles) below the surface. Find the force on one side of a 100-foot square plate at the depth of the Titanic if the plate is

a) Lying horizontally

b) Standing vetically

(12) The figure drawn illustrates the approximate size of the Hoover Dam, which stores water for California, Nevada, and Arizona. Calculate:

a) The water pressure at the base of the dam

b) The total force of the water on the dam.