Work

October 8, 2013

In class problems:

1) An anchor weighing 100 lb in water is attached to a chain weighing 3lb/ft in water. Find the work done to haul the anchor and chain to the surface from a depth of 25 ft.

2) A water tank is in the form of a right circular cylinder with height 20 ft and radius 6 ft. If the tank is half full of water, find the work required to pump all of the water over the top rim.

What if we wanted to pump it 10 ft above the top rim? Note that the density of water is 62.4 lb/ft^3.

3) It is reported 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 amount of work done in building the pyramid. The pyramid is 410 ft high and has a square base 755 by 755 ft. Assuming every laborer worked 10 hours/day, 300 days a year for 20 years, and that a typial worker lifted ten 50 lb blocks a distance of 4 ft every hour, calculate how many workers there were.

4) A flag in the shape of a right triangle with side lengths 3 meters, 4 meters, and 5 meters is hung over the side of a building with the 4 meter side flush with the top of the building. It has a total mass of 110 kg and uniform density. Find its mass. Find the work needed to lift the flag onto the roof of the building.