

3. a 20-lb monkey is attached to a 50-ft chain weighing .5 lb/ft. The other end of the chain is attached to the 40-ft high ceiling of the monkey's cage. Find the amount of work done by the monkey in climbing up her chain to the ceiling.

4. A gas station stores its gasoline in a tank under the ground. The tank is spherical with a radius of 4 feet and the top of the tank is 10 feet under the ground, find the total amount of work needed to pump all of the gasoline out of the tank (assume that the density of gasoline is $\rho = 45\text{lbs}/\text{ft}^3$).

5. Suppose a 1.5-meter rod has density $\rho(x) = x^3 - 4x + 6$ grams per meter, x meters from the left end of the rod. Find both the mass and the center of mass of this rod *exactly*.

6. Half of a uniform circular disc of radius one meter lies with diameter on the y -axis and center at the origin. The mass of the disc is 1 kg. Find the location of its center of mass.