MATH 2300-005 QUIZ 5 Name: _____

Due Tuesday, September 27th at the beginning of class. Please use additional paper as necessary to submit CLEAR and COMPLETE solutions.

1. [Section 6.6, exer. 13] A cable that weighs $2\frac{\text{lb}}{\text{ft}}$ is used to lift 800 lb of coal up a mine shaft 500 ft deep. Find the work done.

2. [Section 6.6, exer. 17] An aquarium 2 m long, 1 m wide, and 1 m deep is full of water. Find the work needed to pump half of the water out of the aquarium. (Use the fact that the density of water is $1000\frac{\text{kg}}{\text{m}^3}$.)

3. Find the centroid $(\bar{x}, \bar{y})$ of the region

$$\left\{ (x, y) : 1 \leq x < \infty, 0 \leq y \leq \frac{1}{x^3} \right\},$$

i.e. the region bounded by $y = 0$ and $y = \frac{1}{x^3}$ for $1 \leq x < \infty$. [Note that the integrals for the moments and area are improper. Even though the region is unbounded in the x-direction, its centroid is still finite.]