Math 1371 – Lecture 25
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Wednesday, November 28, 2007

1 Nuts and bolts

1. Read section 6413, Pumping Water, before workshop tomorrow.

2. Office hours this week: MWF 11-12.

3. Exams in the next three weeks:
   (a) Third-chance gateway exam: today 5 p.m. in 275 Nicholson Hall
   (b) Exam III: Thursday, December 6.
   (c) Final Exam: **Friday, December 14, 1:30 p.m.** This is listed incorrectly as 12/13 in the course pack and in Monday’s lecture notes.

2 What’s happening today

Work.

Example 1. An object is being moved along the y-axis vertically from \( y = 0 \) to \( y = 10 \) feet by a force of \( 2 + \sin(2\pi y) \) lbs. Find the work.

Example 2. A 20-foot chain that weighs 100 pounds (uniformly distributed along its length) is hanging over the side of the bridge. What is the work required to bring the top 15 feet of the chain to the top?

Example 3. A 20-foot chain that weighs 100 pounds (uniformly distributed along its length) is hanging over the side of the bridge and has a bucket hanging from its end. The bucket weighs 20 pounds and initially contains 10 pounds of oil, but it leaks the oil at a constant rate as the bucket is raised at a constant rate, until the oil is gone at the moment the bucket reaches the top. What is the work performed in raising the bucket to the top?

Example 4. A tank full of water is 10 feet long and has cross section as described on the chalkboard for the three cases below. Find the work required to pump the water out of a pipe stretching from the top of the tank to 5 feet above the top of the tank.

1. 5 foot by 10 foot rectangular cross section
2. trapezoidal cross section
3. semi-circular cross section