Announcements

- This week: Final Exam Review
- Homework #10A & 10B Due Wednesday, December 7. 11:00pm
- Bring ReviewOne.pdf and ReviewTwo.pdf to your TA sections this week
- Course evaluations are now open. Your input really matters!
  - 125A: https://uw.iasystem.org/survey/165334 (68% completed)
  - 125B: https://uw.iasystem.org/survey/165324 (85% completed!)
- Final Exam: Saturday, December 10 from 1:30 – 4:20 pm (Bring UW ID)
  - Go to the correct Room: 125 A in KNE 110 and 125 B in KNE 210
  - Cumulative Exam: Covers all material
  - The only calculator allowed is the Ti-30x IIS.
  - Allowed one 8.5 x 11 sheet of notes (both sides)
  - May use the 20 integrals on p. 495 without deriving them. Show your work in evaluating any other integrals, even if on your note sheet.
  - CLUE final exam review Friday: 7-9 pm in MGH 389.

Today

- Final Exam Review - Requested problems

Autumn 2013, Problem 7. The stale air in a crowded exam room initially contains 6.25 ft^3 of carbon dioxide (CO_2). An air conditioner is turned on at time $t = 0$ and blows fresher air into the room at a rate of 500 ft^3/min. The fresher air mixes with the stale air (assume it mixes instantaneously) and the well-mixed air leaves the room at the same rate of 500 ft^3/min. The incoming fresher air contains 0.01% CO_2 (by volume), and the air in the room has a total volume of 2500 ft^3. By their breathing, the people in the room generate an additional 0.08 ft^3 of CO_2 per minute (without changing the total volume of air in the room). Let $y(t)$ denote the amount (in ft^3) of CO_2 in the room, t minutes after the air conditioner is turned on.

1. Find a differential equation satisfied by $y(t)$. Simplify the differential equation, but wait until part (b) to solve it.

2. Now solve the differential equation from part (a), and solve for any constant(s) in your solution to find a formula for $y(t)$.

Autumn 2013, Problem 5. Find the coordinates of the center of mass of a circular plate of radius 1 with center at the origin $(0, 0)$ made with a material whose density is 2 on the upper semicircular region and 1 on the lower semicircular region.

Winter 2005, Problem 5. Let b be a positive number, and consider the region bounded by the curves

$$y = x^2, \qquad y = x^2 + 1, \qquad x = -b, \qquad \text{and} \qquad x = b.$$

1. Find the y-coordinate of the center of mass of this region, in terms of b.

2. Because of the symmetry of this region, the x-coordinate of the center of mass is 0. For small values of b, say $b < M$, the center of mass is in the region, while for $b > M$, the center of mass is outside of the region. Find M.