Announcements

- Assigned reading for the week sections 6.1, 6.2 and 6.3.
- Homework #3 (125 HW 3ABC, all 3 parts) Due Wednesday, October 19, 11:00pm (complete before section on Tuesday 10/18)
- No Quiz next week: HW problems and Midterm review on Tuesday
- Midterm #1 Thursday, October 20 in your sections
  - Covers all material in sections 4.9, 5.1 - 5.5 and 6.1 - 6.3
  - One 8.5 x 11, 2-sided, handwritten sheet of notes (use the preparation of this as a study aid - start this weekend!)
  - The only calculator which may be used is the Ti-30x IIS.
  - You must show all your work and give exact answers to receive credit.
  - Do sample midterms from Math 125 Materials webpage (click on "MIDTERM #1 Achive")
  - CLUE Review: Tuesday October 18, 5:00-7:00pm in MGH 241

Today

- Finish 6.1: Areas between Curves - "y-slicing"
- 6.2 Volume (slicing method)

Areas between Curves III: "y-slicing"

Sometimes it is better to divide the area up into slices (thin rectangles) which are horizontal (i.e. parallel to the x-axis).

The area A of the region bounded by the curves $x = f(y)$ and $x = g(y)$ and between the horizontal lines $y = a$ and $y = b$, where f and g are continuous functions and $f(y) \geq g(y)$ for all y in $[a, b]$ is

$$A = \int_a^b [f(y) - g(y)]\, dy$$

Example ("y-slicing"): Find the area of the region bounded by the two curves

$$4x + y^2 = 12 \qquad \text{and} \qquad x = y.$$

Volumes by Slicing

Definition (Slicing method): Let S be a solid that lies between $x = a$ and $x = b$. If the area of the cross section of S in the plane P_x, through x and perpendicular to the x-axis, is $A(x)$, where A is a continuous function, then the **volume** of S is

$$V = \int_a^b A(x)\, dx$$

Example 1: Verify that the volume of a sphere of radius r is given by

$$V = \frac{4}{3}\pi r^3.$$

Example 2: Find the volume of the solid obtained by rotating the region bounded by $y = x^2$ and $y = 4$ about $y = 4$.