

Math 2315 - Calculus II

Homework #5 - 2007.09.17

Due Date - 2007.09.25

Name: _____

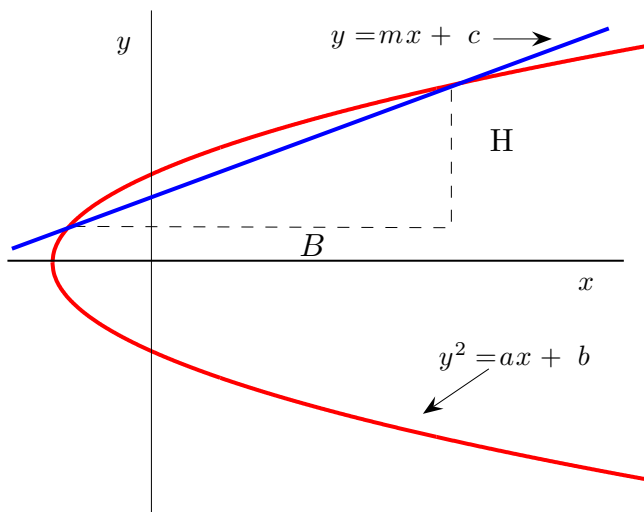
Part 1: Problems from sections 6.2. and 6.3

Part 2: The *fun* problems.

1. Verify the formula

$$\int_{x_1}^{x_2} (x - x_1)(x - x_2)dx = \frac{1}{6}(x_1 - x_2)^3$$

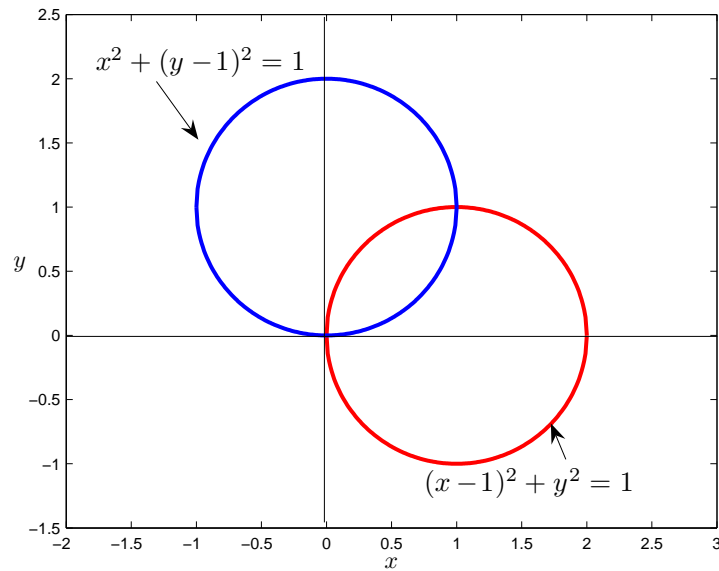
2. Using problem 1, show that the area between the two curves given below, revolved around the x - axis, gives a volume $V = \frac{\pi}{6}BH^2$.



Hint: Let x_1 and x_2 be the root of the function $f(x) = ax + b - (mx + c)^2$, where $x_1 < x_2$. Show that

$$V = \pi \int_{x_1}^{x_2} f(x)dx.$$

3. Let R be the intersection of the circles of radius 1 centered at $(1,0)$ and $(0,1)$. See the picture below.



a) Express the area R as an integral (do not evaluate)

b) The volume of the revolution of R about the x -axis (do not evaluate the integrals).

c) The volume of the revolution of R about the line $x = -2$ (do not evaluate the integrals).

4. As a group, devise a method to find the volume of the object generated by taking the area between the curves $y = 1 - x^2$ and $y = x + 1$ and revolving it about the line $y = x + 1$. See the figure below.

