Part I (due at the beginning of class Monday, September 14)

On the yellow Arc Length handout, complete Example 1 and then work through the derivation of the arc length formula, which ends with Definition 1 on page 5 of the handout. Bring your questions to class Monday!

Part II

No Part II for today as the Part I is lengthy!

Part III: Homework Problems (due Wednesday, September 16 at the beginning of class)

1. Solids of Revolution JEOPARDY!: For each part, the given integral represents the volume of a solid (it's the answer). What's the question that leads to this answer? In other words, write a question in the form of "find the volume of the solid obtained by rotating the region bounded by _____ around the _____ using the _____ method." Fill in each blank and explain how you know those are the things that belong in the blanks.

   (a) $\displaystyle\int_0^{\frac{\pi}{2}} \pi \sin^2 x \, dx$

   (b) $\displaystyle\int_0^3 2\pi x(3x - x^2) \, dx$

   (c) $\displaystyle\int_0^1 \left(\pi(2-x)^2 - \pi(2-(-x^2))^2\right) \, dx$

   (d) $\displaystyle\int_2^4 \pi y^4 \, dy$

Bonus: Suppose a woodworker is making a solid that can be modeled by revolving the region bounded by $y = \frac{1}{2}x^2$ and $y = 2$ around the y-axis. The woodworker then drills a hole through the resulting solid centered along the y-axis so that the resulting solid has $\frac{3}{4}$ the volume of the solid before the hole is drilled. What is the radius of the hole? (Note that bonuses are completely optional!)