

## MATH 210 CALCULUS I

### PROJECT: THE CUP

You have been given an object that will hold liquid. Your task is to determine as much as possible about the object. Your presentation must be between 10 and 15 minutes long and will be on the last day of class..

Your power point report must include the following items listed below:

1. The **volume** that the object will hold. (by integration)
2. The **inner or outer surface** of the object. (by integration: See section 9.2 page 568-572 for formula)
3. The **amount of work** needed to empty the object of water by pumping it over the edge. (by integration)
4. If water is poured in at a constant rate of 2 cubic centimeters per second, at what **rate is the water level rising when the object contains half of its volume?** (related rates)
5. **Include any information or properties that you can determine about the object. Try to include some additional mathematical facts. Be creative. Write as much as you can for this section.**

Use the timetable below to keep track of your progress.

Stage of completion	Date
<b>Equation developed</b> (find function that models your cup)	By April 12 <sup>th</sup>
<b>First four questions answered</b>	By April 26 <sup>th</sup>
<b>Extra information collected</b>	By April 26 <sup>th</sup>
<b>Report completed</b>	By may 3 <sup>rd</sup>
<b>Presentation</b>	May 6 <sup>th</sup>

You'll be evaluated using the criteria below:

1. **Clarity of presentation:** was the writing and narration clear?
2. **Correctness of mathematics:** Were there no mathematical errors? Were the equations developed correct in all aspects?
3. **Was your presentation enjoyable to watch?** Did it incorporate humor?