

## Volume Cross-section Project

Your job is make a physical model of a solid with a known cross section on a base with a standard function, find the volume of your model using a Riemann sum, and the volume using an integral.

1. The base function can be any non-linear function except a parabola, square root, or absolute value.
2. The cross sections can be any shape except a square. You must email me or tell me by Friday, May 12<sup>th</sup> what your base function and cross-sections will be. I must approve them before you begin working.
3. The materials/cross-sections can be no thicker than 0.25". Your model must be at least 6 inches long. There must be at least 24 cross-sections.
4. A typed description of the functions you used and what the cross-sections look like.
  - a) The computed area and volume of each cross-section.
  - b) The total volume of the slices in your model using a Riemann Sum. (Specify Left, Right, Midpoint, or Trapezoidal Sum and show work)
  - c) The theoretical volume as defined by a definite integral. If your problem is not integrable, you may use the Numerical Integration feature of your calculator.
  - d) What did you learn from this project?

### Grading Rubric

#### Paper

Category	Points
Professional and neatly typed mathematical paper	4 points
Description of work (see #4 above)	8 points
Mathematical accuracy	8 points

#### Cross-section Volume

Category	Points
Cross-sections correctly designed and measured	4 points
Area of each cross-section shown	4 points
Riemann Sum calculated correctly and work shown	5 points
Volume computed correctly and work shown.	5 points
Neatness/Execution	4 points
Creativity/Uniqueness	4 points
Complexity of Function	4 points

Total: \_\_\_\_\_/50