2012 Summer Workshop, College of the Holy Cross
Foundational Mathematics Concepts for the High School to College Transition

Day 2 – July 20, 2012

The Group Activity: Where is the center of mass of a triangle?

Materials: One triangle, one string, one nail, one weight, graph paper, and drawing implements.

The goal of this activity is to locate the center of mass of a triangle, which could be used to find a formula for the volume of a bagel with triangular cross-section.

1. Using the string-weight-gravity method, locate the center of mass of your triangle using two of the vertices as pivots.

2. Repeat the process using a different pair of the three vertices. Do the results agree?

3. Taking careful measurements of the points of intersections of the three lines with their opposite sides, what do you observe?

4. Based on your observations, suppose you were given the locations of the vertices of a triangle in the plane. How would you use algebra and equations for lines to find the exact coordinates of the center of mass of the triangle?

5. (For demonstration purposes only!) Suppose a "bagel" with triangular cross-section is obtained by rotating the triangle with vertices $(1, 1)$, $(3, -1)$, and $(5, 1)$ around the y-axis. What is its volume?