

Read page 234 through 270.

1. We have the following theorem from Pappus of Alexandria c. 300 AD. Consider an area D and a line L . Assume that both D and L are in the same plane and that D is on one side of L . Then the volume generated by revolving D about L is equal to the area of D times the distance traversed by the center of mass of D as D revolves about L .

(a) Use Pappus's theorem to find the volume of a torus generated by revolving a circular disk of radius r about a line that is a distance R from the center of the circle. It is assumed that $R > r$.

(b) Use Pappus' theorem to find the center of mass of

$$D = \{(x, y) : x \geq 0 \text{ and } R^2 \geq x^2 + y^2\}.$$

(Suggestion: Let the line be the x-axis. Check your work with calculus.)

2. What is the *Almagest*? (Use the index.) Who wrote it? Did it use the geocentric or heliocentric theory? What did Claudius Ptolemy's other work have to do with Columbus? (See pages 193-194.)

3. Page 233 #6. Find a solution other than the one at the back of the text.

4. Page 233 #9.

5. Page 233 #12.

6. Page 266 #6. (You might want to let T be the area of the triangle with legs a and b and with hypotenuse c , that is, $T=ab/2$.)