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.


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, $T = ab/2$.)