MA 114 Worksheet #29: Conic sections

1. The point in a lunar orbit nearest the surface of the moon is called perilune and the point farthest from the surface is called apolune. The Apollo 11 spacecraft was placed in an elliptical lunar orbit with perilune altitude 110 km and apolune altitude 314 km (above the moon). Find an equation of this ellipse if the radius of the moon is 1728 km and the center of the moon is at one focus.

2. Find an equation for the ellipse with foci $(1, 1)$ and $(-1, -1)$ and major axis of length 4.

3. Use parametric equations and Simpsons Rule with $n = 12$ to estimate the circumference of the ellipse $9x^2 + 4y^2 = 36$.

4. Find the area of the region enclosed by the hyperbola $4x^2 - 25y^2 = 100$ and the vertical line through a focus.

5. If an ellipse is rotated about its major axis, find the volume of the resulting solid.

6. Find the centroid of the region enclosed by the x-axis and the top half of the ellipse $9x^2 + 4y^2 = 36$.

7. Calculate the surface area of the ellipsoid that is generated by rotating an ellipse about its major axis.