Homework 03

Problem 1 (5 points)
Prove that for an orbit governed by
\[ \frac{P}{r} = 1 + e \cos(\theta) \]
the semiminor axis \( (b) \) is given by \( p/\sqrt{1-e^2} \).

Problem 2 (5 points)
Plot an orbit in x,y coordinates for \( p = 1 \) m and \( e = 0.5 \). Make sure that axes ratio is 1, i.e. the plot is not squeezed.

Problem 3 (5 points)
Suppose two masses with their mass ratio \( m_1/m_2 = 3 \) orbit each other and the semimajor axis of the orbit is \( a = 10^4 \) m in the central of mass reference frame and the eccentricity is \( e=0.2 \). Plot orbits of both masses on the same plot as they orbit each other.
Make sure that axes ratio is 1, i.e. the plot is not squeezed.

Problem 4 (5 points)
Solve problem 2.12 from the text book.

Problem 5 (5 points)
Look at the notes at the page 3 of the lecture 06 notes. Proves that eq.2 follows from eq.1.