PRACTICE PROBLEMS for the FINAL for Math 130, Celestial Mechanics, Winter 2017.

A. What are Kepler's three laws? Can you derive law number 2?

B. What are the equations of motion and qualitative behaviour for a logarithmic central potential, $log(r)$. What does the method of effective potentials teach you about the solutions? (This is the method, as per the early days of class, where the "angular" part of the kinetic energy gets absorbed in to the potential to define a new "radial" potential.)

C. Know how to work out the Euler Lagrange equations for a Lagrangian of the form $L(x, y, \dot{x}, \dot{y})$.

D. A general planar quadric in the xy plane is a curve defined by a general quadratic equation of the form $Ax^2 + Bxy + Cxy + ex + fy = d$. Know how to figure out, depending on the coefficients $A, B, \ldots$ whether this curve is an ellipse , parabola, hyperbola or something else.