Newton's Law of Gravity

- Masses attract each other
  - Magnitude of force: $F_g = \frac{G M m}{r^2}$
  - Direction: directly toward the other mass
- Gravitational PE: $U = \frac{-G M m}{r}$
  - Strange (but convenient) function
    - Goes to zero at infinity
    - Negative always

Orbits

- Gravitational force directed toward other object
- If one object way more massive, force on other always directed to same spot
- If just the right distance, force required is the right amount to go in a circle (centripetal force)
- Period (circular orbit of constant speed): $T = \frac{2\pi r}{v}$
- Kepler's 3rd Law: $T^2 = \frac{4\pi^2}{GM} r^3$

Math Review (Binomial Expansion)

- If x much smaller than 1:

$$(1+x)^n \approx 1+nx$$