1) Problem 1.3 (a, b, c, d, and e) from the second edition of *Planetary Sciences* (de Pater & Lissauer).

2) **Radial Velocity.** An astronomer has been collecting radial velocity observations of a nearby star with a mass of 0.6 M\textsubscript{Sun}. She reports a signal with a semi-amplitude $K = 1.6$ m/s and a period of 11 days. The orbit appears to be circular, but the inclination of the planet is unknown.

   a) What is the minimum mass of the planet?
   b) Assuming that inclination angles are randomly distributed, what is the most likely mass of the planet? How does this compare to the answer you found in part (a)?

3) **Kepler's Laws vs. Newton's Laws.** Newton's laws can be used to obtain a revised version of Kepler's Laws of Motion.

   a) Revise Kepler's Second Law to show that the rate at which a line connecting a given planet and the Sun sweeps out area $A$ is half the planet's angular momentum divided by its mass (i.e. $L/2m_p$).
   b) Use Newton's laws of motion and gravity to revise Kepler's Third Law to:
   $$P^2 = \frac{4\pi^2 a^3}{G(m_1 + m_2)}$$

4) Problem 2.4 (a to e) from the second edition of *Planetary Sciences* (de Pater & Lissauer).

5) **Essay question.** (For PHYS 480 students only, this is an optional/bonus question.) Using what we have covered about exoplanets so far (including the FEEPS ch. 1 B+C readings), write a one-page (Times fontsize 11, 1 inch margins) essay on what you believe the future of exoplanet detection should be. To argue your views, consider both:
   - what you have learned about existing detection methods and their limitations to determine what would be feasible,
   - and what we saw about the properties of currently known exoplanet systems to determine what questions astronomers should try to answer next.

Cite references (i.e. published papers) if you use any, but the assigned readings should provide plenty of food for thought as well.