Homework Set #11 Solutions (11/10 - 11/14):

Chapter 9: **Questions** 27, 32, 49 **Exercises** 12, 13, 19

Questions:

27. The scale reading is less than your weight because the inertial force acts opposite to the gravitational force.

32. It would weigh the same because the inertial force acts on the standard masses as well as the book. In effect, you are comparing masses.

49. No, because there is no Coriolis force on the Equator.

Exercises:

12. $W_{eff} = mg_{eff} = W\dfrac{g_{eff}}{g} = W\dfrac{g - a_{in}}{g} = W\left(1 - \dfrac{a_{in}}{g}\right) = 800\text{ N}\left(1 + \dfrac{0.25\text{ g}}{g}\right) = 1000\text{ N}$

13. $W_{eff} = mg_{eff} = m\left(g - a_{in}\right) = \left(8\text{ kg}\right)\left(10\text{ m/s}^2 - \left(-2.5\text{ m/s}^2\right)\right) = 100\text{ N}$

19. $a_c = \dfrac{v^2}{r} = \dfrac{(20\text{ m/s})^2}{40\text{ m}} = 10\text{ m/s}^2$

Chapter 15: **Questions** 3, 5 **Exercises** 3, 9

Questions:

3. In both cases, the net force is downward, back toward the equilibrium point.

5. Increasing the mass will increase the period and decrease the frequency.

Exercises:

3. $f = \dfrac{1}{T} = \dfrac{1}{6\text{ s}} = 0.167\text{Hz}$

9. $f \propto \sqrt{k}$
   If k is quadrupled, f will double.