Homework Set 1

DUE: Thursday January 16

1. Find and correct the error(s) in Example 1.3 on p. 26 of Perkins.

2. Perkins Problem 1.2. Also draw a quark Feynman diagram for this process. [Note that numerical solutions to Perkins problems are given at the end of the book. All the solutions to the starred problems are worth reading. Show all your work in getting your answers.]

3. Perkins Problem 1.4.

4. Perkins Problem 1.6.

5. Perkins Problem 1.7.

6. Perkins Problem 1.10.

7. Which of the following decays are not allowed, and for each state why:

   a) $\mu^- \to e^- + \gamma$

   b) $\mu^+ \to e^+ + \nu_e + \bar{\nu}_\mu + e^+ + e^-$

   c) $\pi^0 \to \gamma + e^+ + e^-$

   d) $\pi^0 \to \mu^+ + e^-$

   e) $\Lambda \to p + K^-$

   f) $\Sigma^+ \to n + \pi^+$

   g) $K^+ \to \pi^+ + \pi^- + \pi^+$

   h) $K^+ \to \pi^0 + \pi^0 + e^+ + \nu_e$

8. Read the article by Steven Weinberg, "Physics: What We Do and Don't Know," *New York Review of Books*, Nov 7, 2013, posted at `http://goo.gl/KnzsT0` .