Phys 4900, Fall 2011
Problem Set #1

1. *Griffiths EP*, **1.2** As Griffiths warns, this calculation is a common but ultimately *bogus* estimate for the mass of a pion, because the energy–time uncertainty relation $\Delta E\,\Delta t \geq \hbar/2$ is not about energy not being conserved.

So we'll do it only to get some practice with the numbers. But if you keep working in physics (especially in nuclear physics) you will certainly hear this argument about the pion mass again. When you do, stand up on your chair and shout"**Boo-guussss!!!**".

2. *Griffiths EP*, **1.3** This one has better reasoning behind it since the uncertainly relation $\Delta x\,\Delta p \geq \hbar/2$ cn be used in this way.

3. *Griffiths EP*, **1.4** Part of why Gell-Mann deserved a Nobel Prize and others organizing the particles into various schemes did not was that he used his scheme to make predictions for the masses of the particles. This problem and the next one let you play around with a couple of the relations he derived.

They're just approximate (and were always meant to be) but they work fairly well.

4. *Griffiths EP*, **1.6**