Particle Physics, Autumn 2006

Assignment 3

1. H&M 5.9

2. H&M 5.12 (Derive eqs. 5.60 and 5.61 also). In addition, show that $\overline{\psi}\gamma^\mu\gamma^5\psi$ behaves like an axial vector.

3. H&M 6.1

X. Derive H&M eqs. 6.22, 6.23, 6.24. No need to submit.

4. Calculate the unpolarized differential cross section ($d\sigma/d\Omega$) for Møller scattering ($e^-e^- \to e^-e^-$) without explicitly substituting $u^{(s)}$ as in H&M sec. 6.2, but by using the Gamma matrix algebra developed later in the chapter.

5. H&M 6.19

X. Make sure you are comfortable with the Compton scattering and Pair annihilation (H&M secs. 6.14 and 6.15), and the crossing relation between them. No need to submit.