Week 5 (due May 7)

1. Problem 66.1 in Srednicky.
2. Problem 62.2 in Srednicky.
3. Consider QED in three space-time dimensions (with the usual kinetic term for the gauge field, not the Chern-Simons term!)

(a) Analyze the superficial degree of divergence, show that only a finite number of diagrams can diverge (i.e. that the theory is superrenormalizable) and list all such diagrams.

(b) Show that in fact all superficially divergent diagrams are finite, if one uses dimensional regularization. Thus no renormalization is necessary, and 3d QED is a finite quantum field theory.