Long Problem Set 1, Problem 2

Kinetic terms for gauge fields:

$$\mathcal{L}_G = -\frac{1}{4} W^i_{\mu\nu} W^{\mu\nu i} - \frac{1}{4} B_{\mu\nu} B^{\mu\nu}$$

with

$$W^i_{\mu\nu} \equiv \partial_\mu W^i_\nu - \partial_\nu W^i_\mu + g\epsilon_{ijk} W^j_\mu W^k_\nu$$
$$B_{\mu\nu} \equiv \partial_\mu B_\nu - \partial_\nu B_\mu$$

After writing in terms of physical fields $W^{+/-}$, Z and A one finds trilinear and quartic couplings: $W^+ W^- Z$, $W^+ W^- A$, $W^+ W^- W^+ W^-$, $W^+ W^- ZZ$, $W^+ W^- ZA$, $W^+ W^- AA$.

Problem 2: show that these are the allowed trilinear and quartic couplings of the SM