MATH 641: HOMEWORK 1 DUE FRIDAY, FEB 10

Please solve the following problems taken from Barg's notes.

1. Page 20: Show that the sum of two even-weighted vectors has even weight.

2. Page 25: Show that Hamming distance is a translation-invariant metric (if you don't know the definition of metric, just email me - translation-invariant means that d(u+e,v+e) = d(u,v) for all vectors u,v,e).

3. Page 35: Suppose that the rank of $H(E)$ is less than $|E|$. Is there a codeword with $\mathrm{supp}(x) = E$? (Hint: first, look for counterexamples.)

4. Page 49: Show that the set of correctable errors $E(C)$ are the unique vectors of smallest weight in their cosets.