Homework 4: Monday, 11 November, 2019

1. Show that $\max_3(r, 2) = 2^{r-1}$.

2. Show that if S is an n-cap of $PG(r, 2)$ such that $|S| = 2^r$, (which is maximum) then S is a collection of some points of $PG(r, 2)$ that form a set which is the complement of some hyperplane in $PG(r, 2)$.

3. Explain as to why the parity check matrix H used to construct a q-ary code C which is an $[n, n-3, 4]$ code with $n = q + 2$ and q a power of 2 cannot be used to obtain q-ary code C which is an $[n, n-3, 4]$ code with q an odd prime power.