Cory Glover
2/6/20
Math 525

HW 12

8.1.

1. $O(n)$
2. $O(n)$

8.3.

1. $O(n^2)$
2. $O(m)$
3. $O(m)$. Consider the vector multiplication of the modularity matrix. Since vector multiplication is distributive, we can multiply the vector by the adjacency matrix using list format, which as shown above is $O(m)$. Then to calculate $\frac{k_i k_j}{2m}$ for every combination of i and j takes n calculations of $O(m/n)$, since we are finding how many nodes are connected to another node. So in total this takes $O(m)$. So we have 2 operations of complexity $O(m)$, thus the whole process is $O(m)$.