# Exercise sheet 2

Curves and Surfaces, MTH201

1. Prove that in any group with at least 2 people, there must exist at least two individuals who know the same number of people.
2. Prove that if from a set of $n$ integers, none of which are a multiple of $n$, one can choose two whose difference is a multiple of $n$.
3. Prove that a subset of $\{1, 2, \ldots, 2n+1\}$ with cardinality $n+1$ has a pair of coprime elements.
4. Consider 5 points in $\mathbb{R}^2$ with integer coordinates. Show that there are at least two whose mid-point of the line segment joining them also have integer coordinates.
5. Compute the Ramsey numbers $R(1, n)$ and $R(2, n)$ for any $n$. Prove that $R(m, n) = R(n, m)$.