Practice Exam 2

1. Show that $n\mathbb{Z}$ is a subgroup of $\mathbb{Z}$ (using the normal $+$) for all $n \in \mathbb{Z}$.

1. Written Solution
2. Video Solution

2. Define a relation $R = \{(x, y) \in \mathbb{R} \times \mathbb{R} : x - y \in \mathbb{Z}\}$. Prove that R is an equivalence relation. Find the partition of $\mathbb{R}$ created by the equivalence classes.

1. Written Solution
2. Video Solution

3. Show that congruence modulo n is a congruence relation on $\mathbb{Z}$ for all $n \in \mathbb{Z}$ and for both addition and multiplication.

1. Written Solution

4. Let $G = S_3$. Find all subgroups of G.

1. Written Solution