

Let $E = \mathbb{Z}, nRp \iff p - n = 2k, k \in \mathbb{Z}$. Prove that R is an equivalence relation.

$$p - n = 2k, k \in \mathbb{Z}$$

$$\Rightarrow n - p = 2j \mid j = -k, j \in \mathbb{Z}$$

$$\Rightarrow nRp \iff pRn$$

$$p - n = 2k \text{ and } p - l = 2j, (j, k) \in \mathbb{Z}$$

$$\Rightarrow l - n = 2(j - k), (j - k) \in \mathbb{Z}$$

$$\Rightarrow pRn \text{ and } pRl \Rightarrow nRl$$

$$n - n = 0, 2 \parallel 0$$

$$\Rightarrow nRn$$

$$C_x = \{y \mid y = x - 2k, k \in \mathbb{Z}\}$$