- Let $\mathcal{R} \subseteq \mathbb{Z} \times \mathbb{Z}$ where

$$\mathcal{R} = \{(a, b) : b \text{ divides } a\}.$$

- Then

$$\mathcal{R}^* = \{(a, b) : a \text{ divides } b\}.$$

- So what is $\mathcal{R} \cap \mathcal{R}^*$?
    - All pairs of integers (x, y) such that $x|y$ and $y|x$.
    - If $x|y$ then $y = kx$ for some $k \in \mathbb{Z}$.
    - If $y|x$ then $x = \ell y$ for some $\ell \in \mathbb{Z}$.
    - Therefore $x = \ell k x \implies \ell k = 1$.
    - Two cases: $k = \ell = 1$ and $k = \ell = -1$.
    - $\mathcal{R} \cap \mathcal{R}^* = \{(a, a) : a \in \mathbb{Z}\} \cup \{(a, -a) : a \in \mathbb{Z}\}$.