Examples 1

- The diagonal relation on A:

$$\mathcal{R} = \{(a, a) : a \in A\}.$$

- Let $A = \mathbb{Z}$ and

$$x \mathcal{R} y \iff (y - x) \text{ is even} \iff x \equiv y \pmod 2$$

  - reflexive: $x - x = 0$ is even for all $x \in \mathbb{Z}$;
  - symmetric: if $y - x$ is even, then so is $x - y = -(y - x)$;
  - transitive: assume that $x - y$ and $y - z$ are even. Then

$$x - z = (x - y) + (y - z)$$

    is also even.