

Work on these with your partner(s) at the board

1. Let $A = \{-1, 1, 2, 4\}$ and $B = \{1, 2\}$.

Define relations R and S from A to B by

$$a R b \text{ iff } |x| = |y|$$

$$a S b \text{ iff } x - y \text{ is even}$$

Explicitly list the ordered pairs in $A \times B$, R , S , $R \cup S$, and $R \cap S$

Epp, Exercise 8.1.20

2. For each relation,

- (i) Give three ordered pairs in the relation
- (ii) Give three ordered pairs not in the relation
- (iii) Determine whether the relation is reflexive, symmetric, transitive, or none of these.

(a) C is the circle relation on \mathbb{R} : $\forall x, y \in \mathbb{R}, x C y \text{ iff } x^2 + y^2 = 1$

(b) F is the mod 5 congruence relation on \mathbb{Z} : $\forall m, n \in \mathbb{Z}, m F n \text{ iff } 5 \mid (m - n)$

Epp, Exercises 8.2.10, 13, 17