

## Discuss with your partner(s)

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, give three ordered pairs in the relation and three ordered pairs not in the relation. Then 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  $\mathbb{Z}$ :  $\forall m, n \in \mathbb{Z}, m F n \text{ iff } 5 \mid (m - n)$

(c)  $P$  is defined on  $\mathbb{N}$ :  $\forall m, n \in \mathbb{N}, m P n \text{ iff } \exists \text{ prime } p \text{ s.t. } p \mid m \text{ and } p \mid n$

Epp, Exercises 8.2.10, 13, 17