

Discrete Math HW 4: Learning goals S1, S2

S1: I can state the definitions, and determine membership, of standard sets such as \mathbb{N} , \mathbb{Z} , \mathbb{Q} , and \mathbb{R} .

Exercise 1 Name three examples of numbers which are members of \mathbb{Z} but not \mathbb{N} .

Exercise 2 Name three examples of numbers which are in \mathbb{Q} but not \mathbb{Z} .

Exercise 3 For the purposes of this class, is $0 \in \mathbb{N}$?

Exercise 4 Which of \mathbb{N} , \mathbb{Z} , \mathbb{Q} , and \mathbb{R} are closed under

- addition?
- subtraction?
- multiplication?
- division?

S2: I can evaluate and construct sets using union, intersection, difference, and complement of sets, and sets defined via set builder notation.

Note: this week we only covered part of this learning goal, namely set builder notation. We will cover union, intersection, difference, and complements of sets next week.

Exercise 5 List the elements of each of the following sets.

1. $\{n \mid n \in \mathbb{N}, n < 6\}$
2. $\{n \mid n \in \mathbb{Z}, n < 6, n > -2\}$
3. $\{n^2 + 3 \mid n \in \mathbb{Z}, -2 \leq n \leq 3\}$
4. $\{(a, b) \mid a \in \mathbb{Z}, b \in \mathbb{N}, b \leq 9, a^2 = b\}$
5. $\{xy \mid x \in \mathbb{N}, y \in \mathbb{N}, x \leq 4, y \leq 4\}$

Exercise 6 Complete the Disco exercises in `s2a.disco`, which you can find linked from the course website.