

## Extra Practice for Section I: Chapter 0

1.
  - a. What symbol is used to represent the *set of integers*?
  - b. What symbol is used to represent the *set of real numbers*?
  - c. Discuss the differences between the *set of integers* and the *set of real numbers*.

[Click here to see the solution to 1.](#)

2. Use proper set notation to represent the following statements:
  - a. “7 is an element of the set of integers.”
  - b. “The union of the set  $\{1, 2, 3\}$  with the set  $\{3, 4, 5\}$  equals the set  $\{1, 2, 3, 4, 5\}$ .”
  - c. “The intersection of the set  $\{1, 2, 3\}$  with the set  $\{3, 4, 5\}$  equals the set  $\{3\}$ .”

[Click here to see the solution to 2.](#)

3.
  - a. Express  $\{x \mid x \in \mathbb{R} \text{ and } -1 < x \leq 5\}$  in *interval notation*.
  - b. Express  $[7, 13)$  in *set-builder notation*.
  - c. Express  $\{x \mid x \in \mathbb{Z} \text{ and } -1 < x \leq 5\}$  in *roster notation* and explain why it isn't possible to represent in interval notation.

[Click here to see the solution to 3.](#)

**Solution to 1.**

1. a. What symbol is used to represent the *set of integers*?

The symbol " $\mathbb{Z}$ " represents the *set of integers*.

- b. What symbol is used to represent the *set of real numbers*?

The symbol " $\mathbb{R}$ " represents the *set of real numbers*.

- c. Discuss the differences between the *set of integers* and the *set of real numbers*.

The set of integers,  $\mathbb{Z}$ , only contains whole numbers but the real numbers contains the fractions and the irrational numbers. (Since any integer can be expressed as a fraction, the integers are a *subset* of the real numbers.) The real numbers are often called "the continuum" since they can be represented by a continuous line (often called a *number line*) in which every dot on the line represents a real number, and there's always another real number between any two real numbers, so there are no gaps in the line. On the other hand, the integers are considered a *discrete* number set since, between consecutive numbers like 1 and 2, there are no numbers, i.e., there's "space" between the numbers.

[CLICK HERE TO RETURN TO THE PRACTICE PROBLEMS](#)

**Solution to 2.**

**2.** Use proper set notation to represent the following statements:

**a.** “7 is an element of the set of integers.”

$$7 \in \mathbb{Z}$$

**b.** “The union of the set  $\{1, 2, 3\}$  with the set  $\{3, 4, 5\}$  equals the set  $\{1, 2, 3, 4, 5\}$ .”

$$\{1, 2, 3\} \cup \{3, 4, 5\} = \{1, 2, 3, 4, 5\}$$

**c.** “The intersection of the set  $\{1, 2, 3\}$  with the set  $\{3, 4, 5\}$  equals the set  $\{3\}$ .”

$$\{1, 2, 3\} \cap \{3, 4, 5\} = \{3\}$$

[CLICK HERE TO RETURN TO THE PRACTICE PROBLEMS](#)

**Solution to 3.**

- 3. a.** Express  $\{x \mid x \in \mathbb{R} \text{ and } -1 < x \leq 5\}$  in *interval notation*.

$$\{x \mid x \in \mathbb{R} \text{ and } -1 < x \leq 5\} = (-1, 5]$$

- b.** Express  $[7, 13)$  in *set-builder notation*.

$$[7, 13) = \{x \mid x \in \mathbb{R} \text{ and } 7 \leq x < 13\}$$

- c.** Express  $\{x \mid x \in \mathbb{Z} \text{ and } -1 < x \leq 5\}$  in *roster notation* and explain why it isn't possible to represent in interval notation.

$$\{x \mid x \in \mathbb{Z} \text{ and } -1 < x \leq 5\} = \{0, 1, 2, 3, 4, 5\}$$

This set cannot be represented using interval notation since interval notation is reserved for continuous (i.e., unbroken) 'intervals' of real numbers. This set only contains a handful of whole numbers, not every number in a continuous interval of real numbers, so interval notation isn't applicable.

[CLICK HERE TO RETURN TO THE PRACTICE PROBLEMS](#)