Lesson 4
Classifying Real Numbers

NAME:

Start by navigating to the Online Lesson for instructions.

Objectives

- Classify a number as rational or irrational
- Classify real numbers

Why?

Math is a language. Just like any language, it is important to understand the vocabulary and word usage. If the directions tell you that the equation must be written with only integer coefficients or that the solution is irrational, you need to be familiar with those words so you can determine if you are solving the problem correctly.

Explore

Classifying Real Numbers

Fill in the notes as you watch the video in the Online Lesson.

- Every number that you have learned about so far is a _____. That includes square and cube roots, π, as well as positive or negative numbers.
- Real numbers are all the numbers that can be plotted on a _____ _____.
- To _____ a real number is to identify the specific subsets to which it belongs.
- Each number set in the Real Number System is represented by a _____ that you can see next to the name of the set.
- Real numbers ($\mathbb{R}$) have two main subsets: _____ and _____ numbers.

Real Number System ($\mathbb{R}$)

Rational Numbers ($\mathbb{Q}$)	Irrational Numbers ($\mathbb{I}$)

- Within the set of rational numbers, there are _____, _____, and _____.
  - Natural numbers ($\mathbb{N}$) are often thought of as "counting numbers" beginning at one. Written as a set: _____.
  - Whole numbers ($\mathbb{W}$) include all of the natural numbers and add the number 0. Written as a set: _____.
  - Integers ($\mathbb{Z}$) include all of the whole numbers and their opposites. Integers are positive and negative whole numbers. Written as a set: _____.
- Rational numbers ($\mathbb{Q}$) can be expressed as a _____ where a and b are integers and b cannot equal zero.
- Integers ($\mathbb{Z}$) , whole numbers ($\mathbb{W}$) and natural numbers ($\mathbb{N}$) can be written as _____ when put over the number _____.

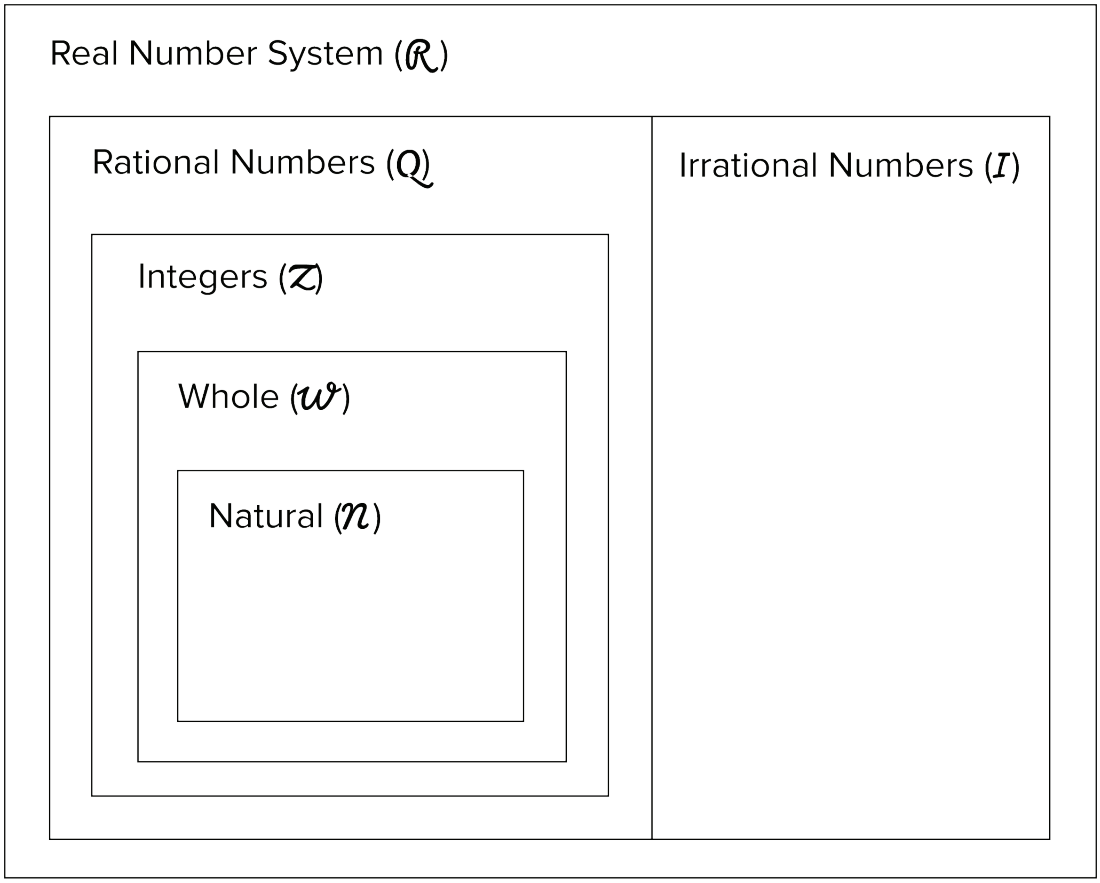
- Rational numbers ($\mathbb{Q}$) can be written as _____ or _____.
- However, when rational numbers are written as decimals they will either _____ or _____.

A) $\frac{5}{6} = 0.8\overline{3}$ **B)** $\frac{7}{4} = 1.75$ **C)** $\sqrt{25} = 5$

- Irrational numbers _____ be written as a ratio of two integers. This means it cannot be written _____ as a fraction or a decimal.
- Irrational numbers when written as a decimal are _____ and _____.

A) $\sqrt{2} = 1.414213562\ldots$ **B)** $\pi = 3.14159254\ldots$ **C)** $6.251782306\ldots$

Each subset of the real number system can be represented in this diagram.



Example 1

Complete the example as you watch the video in the Online Lesson.

Determine if the number is rational or irrational. Explain.

A) $-\frac{7}{18}$ **B)** $\sqrt[3]{17}$ **C)** 35%

Example 2

Complete the example as you watch the video in the Online Lesson.

Determine if the rational number is an integer, whole number, or natural number. It is possible to have more than one answer.

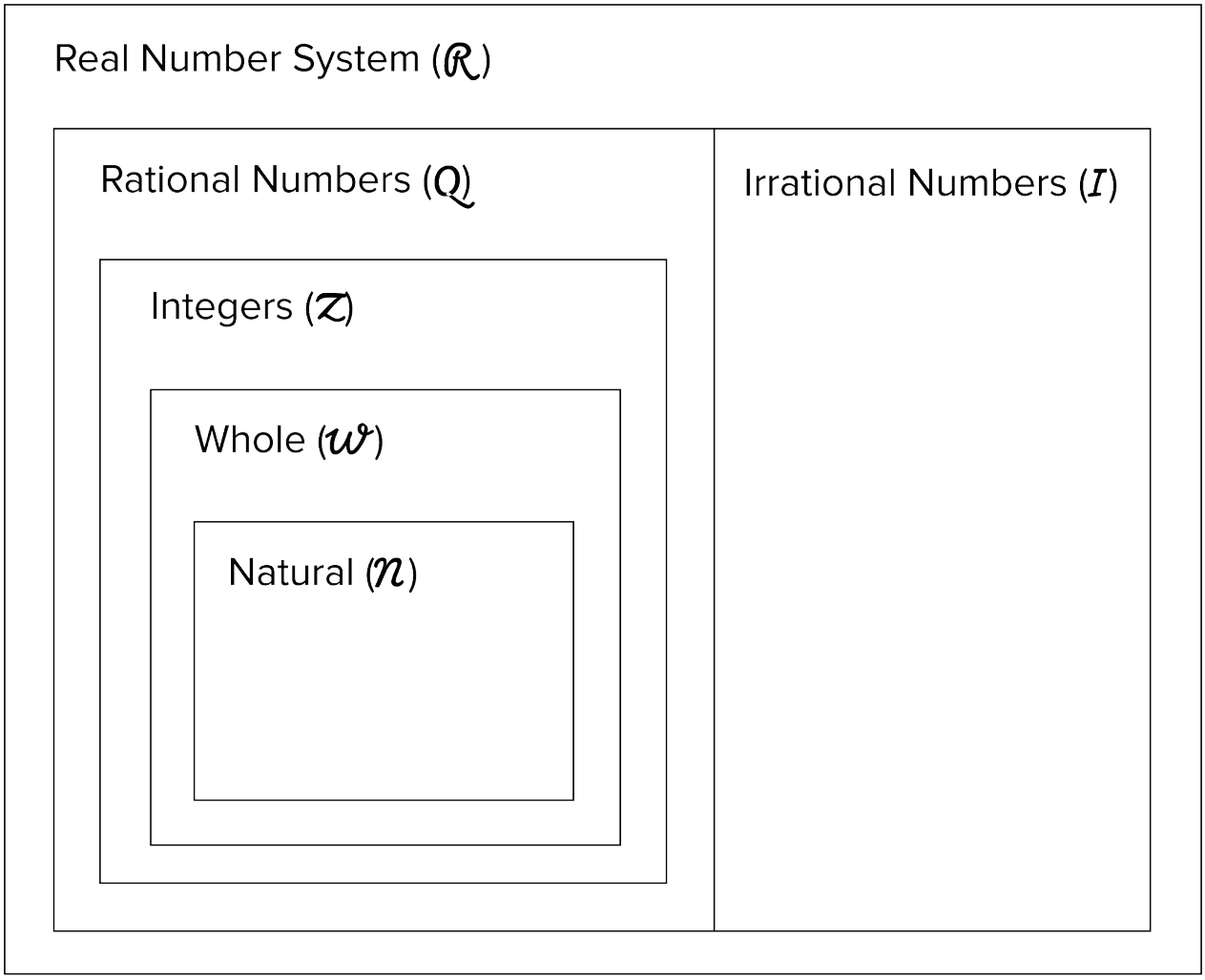
A) $-\sqrt{16}$ **B)** 0 **C)** 7

Example 3

Complete the example as you watch the video in the Online Lesson.

Place the numbers for A–E in the most specific set in the diagram.

A) $\sqrt{23}$ **B)** $\sqrt{9}$ **C)** $-\frac{5}{3}$ **D)** 0 **E)** -16



Practice

Determine if the number is rational or irrational. Explain.

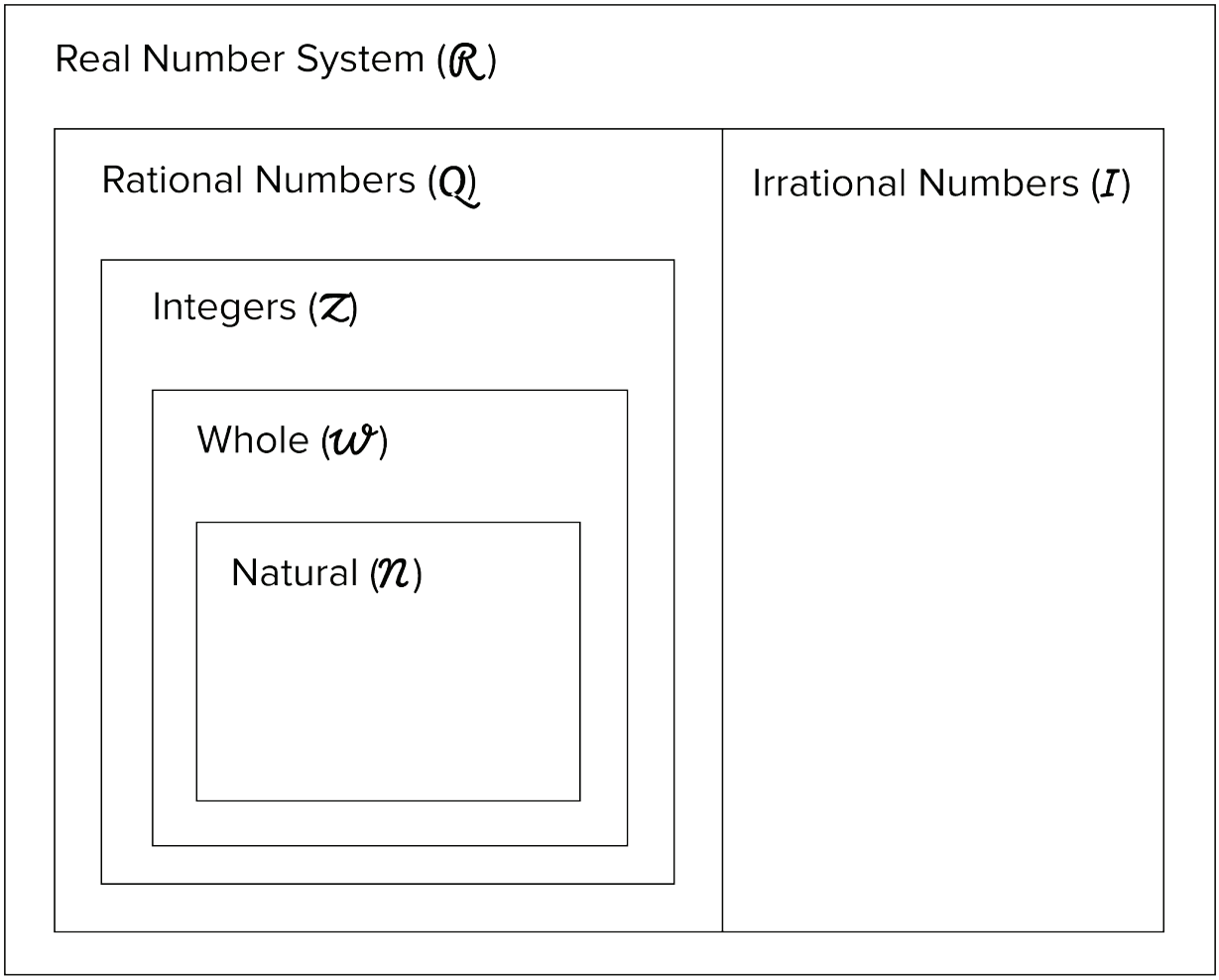
1) $7.251683\ldots$

2) $\frac{3}{8}$

3) $-\frac{7}{7}$

4) π

For problems 5–12, classify the given number into all sets of real numbers to which it belongs, then place the number in the most specific number set in the diagram.



For problems 5–12, classify the given number into all sets of real numbers to which it belongs, then place the number in the most specific number set in the diagram.

5) $\frac{18}{3}$

6) $\sqrt{5}$

7) $\frac{8}{9}$

8) $-\frac{16}{4}$

9) $\sqrt{100}$

10) 0

11) 125%

12) $2.717273747\ldots$

To continue, return to the Online Lesson.