

# South Carolina SC READY Grade 8 Math Step by Step

*A Beginner Friendly Guide to Learning Math*

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## ★ *Table of Contents* ★

*Here's what we'll explore together!*

★ 1	<i>Irrational Numbers</i> .....	2
★ 2	<i>Lines and Linear Equations</i> .....	7



*Let's learn and have fun!*

PREVIEW



CHAPTER

1

# Irrational Numbers

## ★ What's Inside ★

1.1 Rational and Irrational Numbers .....	3
---	---



## ★ 1.1 Rational and Irrational Numbers ★

### What You'll Learn

- Classify a real number as rational or irrational
- List all real number subsets a number belongs to

### Words to Know

- ▶ **Real Number** — Any number on the number line.
- ▶ **Integer** — A whole number or its opposite, such as  $-3$ ,  $0$ , or  $8$ .
- ▶ **Whole Number** —  $0$  or any positive counting number.
- ▶ **Natural Number** — A positive counting number such as  $1$ ,  $2$ , or  $3$ .

### ☰ How to Classify a Real Number into Subsets

- 1 Decide first whether the number is rational or irrational.
- 2 If it is rational, check whether it is also an integer, a whole number, or a natural number.
- 3 Remember that every rational number and every irrational number is also a real number.
- 4 List every set that fits the number, not just one of them.

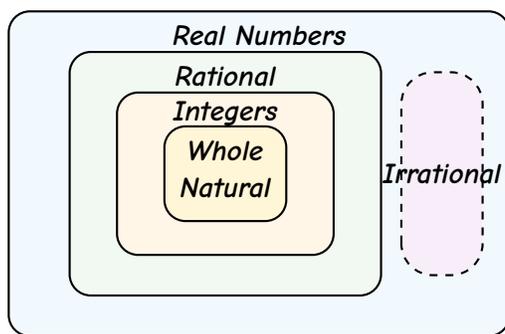


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**Example:** Classify  $7$ ,  $0$ ,  $-3$ ,  $\frac{2}{3}$ , and  $\sqrt{5}$  into all real number subsets.

**Step 1** Decide whether each number is rational or irrational. The numbers  $7$ ,  $0$ ,  $-3$ , and  $\frac{2}{3}$  are rational. The number  $\sqrt{5}$  is irrational.

**Step 2** Check the rational numbers more closely. The number  $7$  is an integer, whole number, and natural number. The number  $0$  is an integer and whole number. The number  $-3$  is an integer. The number  $\frac{2}{3}$  is not an integer.

**Step 3** Every one of these numbers is real because all rational and irrational numbers are real.

**Step 4** List every set that fits each number.

✓  $7$ : natural, whole, integer, rational, real;  $0$ : whole, integer, rational, real;  $-3$ : integer, rational, real;  $\frac{2}{3}$ : rational, real;  $\sqrt{5}$ : irrational, real.

**Example:** Classify  $\sqrt{49}$  and  $0.\overline{3}$  into all real number subsets.

**Step 1** Rewrite the numbers in a helpful form:  $\sqrt{49} = 7$  and  $0.\overline{3} = \frac{1}{3}$ .

**Step 2** Since  $7$  is a counting number, it fits the natural, whole, integer, rational, and real sets.

**Step 3** Since  $\frac{1}{3}$  is a repeating decimal, it is rational, and all rational numbers are real.



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**Step 4** The decimal  $0.\overline{3}$  is not an integer, whole number, or natural number.

✓  $\sqrt{49}$  is natural, whole, integer, rational, and real. The number  $0.\overline{3}$  is rational and real.

**⚠ Watch Out!** The number 0 is whole, integer, rational, and real, but it is usually not counted as a natural number in this book.



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## Real Number Subsets Practice

### Rational or Irrational

1. Is  $\sqrt{49}$  rational or irrational? \_\_\_\_\_
2. Is  $\sqrt{11}$  rational or irrational? \_\_\_\_\_

### List All Subsets

3. Classify  $-8$  into all real number subsets. \_\_\_\_\_
4. Classify  $0.\overline{3}$  into all real number subsets. \_\_\_\_\_

### Check Perfect Squares

5. Classify  $\sqrt{64}$  into all real number subsets. \_\_\_\_\_

### Use the Diagram Idea

6. A student says every whole number is also rational. Is the student correct? \_\_\_\_\_



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CHAPTER

2

# Lines and Linear Equations

## ★ What's Inside ★

2.1 Graphing Proportional Relationships .....	8
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## ★ 2.1 Graphing Proportional Relationships ★

### What You'll Learn

- Graph proportional relationships and interpret the unit rate as slope
- Compare proportional relationships shown in different ways

### Words to Know

- ▶ **Proportional Relationship** — A relationship where  $y = kx$  and the line passes through the origin.
- ▶ **Unit Rate** — The constant  $k$  in  $y = kx$ ; also called the constant of proportionality.

### How to Find and Compare Unit Rates

- 1 Pick any point  $(x, y)$  on the line or from the table and divide:  $k = \frac{y}{x}$ .
- 2 Write the equation  $y = kx$ .
- 3 To compare two relationships, find  $k$  for each and see which is larger or smaller.



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*Example: A car travels 150 miles in 3 hours at constant speed. Find the unit rate and write the equation.*

**Step 1**  $k = \frac{150}{3} = 50$  miles per hour.

**Step 2** The equation is  $y = 50x$ .

**Step 3** Not comparing here — just one relationship.

✓ Unit rate = 50 mph; equation:  $y = 50x$

*Example: Runner A:  $y = 8x$ . Runner B covers 35 miles in 5 hours. Who is faster?*

**Step 1** Runner A:  $k = 8$ . Runner B:  $k = \frac{35}{5} = 7$ .

**Step 2** Runner A:  $y = 8x$ . Runner B:  $y = 7x$ .

**Step 3** Compare:  $8 > 7$ , so Runner A is faster.

✓ Runner A is faster (8 mph vs. 7 mph).



A proportional relationship always passes through the origin (0,0). If it doesn't, it's not proportional!



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## Graphing Proportional Relationships Practice

### Find the Unit Rate

1. A graph passes through  $(4, 12)$ . What is  $k$ ? \_\_\_\_\_
2. A table shows  $(5, 20)$ . What is  $k$ ? \_\_\_\_\_

### Write the Equation

3. Store A charges \$3 per pound. Write the equation. \_\_\_\_\_

### Compare

4. Store A:  $y = 3x$ . Store B charges \$2.50 per pound. Which is cheaper? \_\_\_\_\_
5. A recipe uses 2 cups of flour for every 3 cookies. How many cups are needed for 12 cookies?

**Answer:** \_\_\_\_\_ cups



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