

Montana MontCAS Grade 8 Math Step by Step

A Beginner Friendly Guide to Learning Math

Dr. A. Nazari

Copyright © 2026 Dr. A. Nazari

Published by View Math Education

ViewMath.com

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the author, except in the case of brief quotations embodied in critical reviews and certain other noncommercial uses permitted by copyright law, including Section 107 or 108 of the 1976 United States Copyright Act.

The information in this book is distributed on an “as is” basis, without warranty. While every precaution has been taken in the preparation of this work, neither the author nor the publisher shall have any liability to any person or entity with respect to any loss or damage caused or alleged to be caused directly or indirectly by the information contained in this book.

Copyright © 2026



★ Table of Contents ★

Here's what we'll explore together!

★ 1	<i>Irrational Numbers</i>	2
★ 2	<i>Lines and Linear Equations</i>	6



Let's learn and have fun!

PREVIEW



CHAPTER

1

Irrational Numbers

★ *What's Inside* ★

1.1 <i>Rational and Irrational Numbers</i>	3
---	----------

★ 1.1 Rational and Irrational Numbers ★

What You'll Learn

- Tell whether a number is rational or irrational
- Use decimals, fractions, and square roots to justify your answer

Words to Know

- ▶ **Rational Number** — A number that can be written as $\frac{a}{b}$ where a and b are integers and $b \neq 0$.
- ▶ **Irrational Number** — A number that cannot be written as a fraction of two integers.
- ▶ **Decimal Expansion** — The decimal form of a number, such as terminating, repeating, or nonrepeating.

How to Classify a Number as Rational or Irrational

- 1 Check whether the number is already a fraction, an integer, a terminating decimal, or a repeating decimal.
- 2 If it can be written as $\frac{a}{b}$, then it is **rational**.
- 3 If its decimal never ends and never repeats, then it is **irrational**.
- 4 Use a short reason, such as **repeats**, **terminates**, or **not a perfect square**.



Find more at
[ViewMath.com/Grade8](https://www.viewmath.com/Grade8)



Example: Classify -4 , 0.375 , $0.\overline{18}$, and $\sqrt{7}$.

Step 1 Look at each number's form. -4 is an integer, 0.375 is a terminating decimal, $0.\overline{18}$ is a repeating decimal, and $\sqrt{7}$ is a square root.

Step 2 Write the rational numbers as fractions when possible: $-4 = \frac{-4}{1}$, $0.375 = \frac{375}{1000} = \frac{3}{8}$, and $0.\overline{18} = \frac{18}{99} = \frac{2}{11}$.

Step 3 Since 7 is not a perfect square, $\sqrt{7}$ has a decimal that never ends and never repeats.

Step 4 So -4 , 0.375 , and $0.\overline{18}$ are rational, and $\sqrt{7}$ is irrational.

✓ -4 , 0.375 , and $0.\overline{18}$ are rational; $\sqrt{7}$ is irrational.

Example: Classify $\sqrt{49}$ and π .

Step 1 Decide whether each number can be rewritten in a simpler form.

Step 2 $\sqrt{49} = 7$, and $7 = \frac{7}{1}$, so it is rational.

Step 3 $\pi = 3.14159 \dots$ never ends and never repeats, so it is irrational.

Step 4 A square root is only irrational when the number under the root is **not** a perfect square.

✓ $\sqrt{49}$ is rational, but π is irrational.

⚠ Watch Out! Not every square root is irrational. For example, $\sqrt{64} = 8$, so it is rational.



Get Online



Find more at
ViewMath.com/Grade8



Rational and Irrational Numbers Practice

Spot the Form

1. Is $\frac{5}{12}$ rational or irrational? _____
2. Is 0.81 rational or irrational? _____

Use the Decimal Pattern

3. Is $0.\overline{6}$ rational or irrational? _____
4. Is 1.010010001... rational or irrational?

Check Square Roots

5. Is $\sqrt{36}$ rational or irrational? _____

Explain Your Choice

6. A student says $\sqrt{15}$ is rational because it is a square root. Is the student correct? _____



Find more at
[ViewMath.com/Grade8](https://www.viewmath.com/Grade8)



CHAPTER

2

Lines and Linear Equations

★ *What's Inside* ★

2.1 <i>Graphing Proportional Relationships</i>	7
---	----------

★ 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

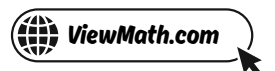
- ▶ **Proportional Relationship** — A relationship where $y = kx$ and the line passes through the origin.
- ▶ **Unit Rate** — The constant k in $y = kx$; also called the constant of proportionality.

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.



Find more at
[ViewMath.com/Grade8](https://www.viewmath.com/Grade8)



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!



Find more at
[ViewMath.com/Grade8](https://www.viewmath.com/Grade8)



 **ViewMath.com**

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



Find more at
[ViewMath.com/Grade8](https://www.viewmath.com/Grade8)



THANK YOU

Enjoyed This Preview?

Get the Full Book!

This preview shows just a small sample of what's inside.

The complete book includes:

- ✓ *All chapters and topics*
- ✓ *Hundreds of practice problems*
- ✓ *Complete answer key with explanations*
- ✓ *Colorful visuals and step-by-step examples*
- ✓ *Reference sheets and progress trackers*

 Visit us at [ViewMath.com](https://www.viewmath.com) for free resources and more books!