

Virginia SOL Grade 7 Math Step by Step

A Beginner Friendly Guide to Learning Math

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YOUR STEP-BY-STEP MATH GUIDE

Math Step by Step

Clear Steps • Worked Examples • Guided Practice

This book breaks every Grade 7 math topic into clear, numbered steps. Read the steps, follow the worked examples, try the guided practice, then solve problems on your own. The answer key in the back lets you check your work and learn from every mistake.



Step-by-Step Method

Every topic is taught as a numbered procedure — follow the steps and you'll get the answer.



9 Chapters, 56 Topics

From ratios and percents to probability — every Grade 7 standard covered.



Guided Practice

Try-it-yourself problems with blanks that walk you through each step before you go solo.



Complete Answer Key

Every problem has an answer in the back. Check your work, learn from mistakes, and try again.

How to Use This Book

Four steps to master every topic.

1

Read the Steps

Each topic opens with a numbered list of steps that tells you exactly what to do. Read through the steps first so you have the full picture before diving into problems.

2

Follow the Examples

Worked examples show every step applied to a real problem. Follow along with pencil and paper — try covering the solution and solving it yourself before looking.

3

Try the Guided Practice

“Your Turn” problems give you blanks to fill in as you apply each step. This bridges the gap between watching and doing.

4

Practise on Your Own

Each section ends with independent practice problems. Write out all your steps, then check answers in the back. When you find a mistake, figure out where your reasoning went wrong and try again.

Suggested Study Routine

- » **Weekdays:** Study one topic per day (about 20–30 minutes).
- » **End of week:** Review your notes and redo any problems you missed.
- » **Before a test:** Flip through the steps cards for a fast refresher on every method.

 Pair It Up

This book teaches the how one step at a time. For extra drill, pair it with the Grade 7 Math Workbook — hundreds of additional practice problems organised by the same chapters and topics.

 For Parents & Teachers

- » Encourage students to read the steps aloud before attempting problems.
- » Keep study sessions to 20–30 minutes for best focus.
- » Celebrate effort and progress, not just correct answers.



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How Every Topic Works

Every topic in this book follows the same structure.

PREVIEW

Title & Learning Goal

- 1 Each topic opens with a clear title and a brief statement of what you will learn. This tells you the destination before you start walking.

The Steps Card

- 2 A numbered list of every step you need. Read these first — they are your roadmap. Each step is colour-coded so you can track it through the examples.

Worked Examples

- 3 One or more fully solved problems. Every step label appears in the solution so you can see exactly where each step is used. Follow along with pencil and paper.

Your Turn (Guided Practice)

- 4 A problem with blanks for you to fill in, step by step. This is your training-wheels round — you practise the method with support before going solo.

Practice Problems

- 5 Independent problems to solve on your own. Answers are in the Answer Key at the back of the book — always check your work!

Tips & Watch-Out Boxes

- 6 Look for the 💡 tip and ⚠ warning boxes — they highlight common mistakes and shortcuts that save time.



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 Every topic follows this same pattern. Once you know the rhythm, you can focus on the math.

PREVIEW



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★ *Table of Contents* ★

Here's what we'll explore together!

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Let's learn and have fun!



CHAPTER

1

Ratios and Proportional Relationships

★ What's Inside ★

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★ 1.1 Unit Rates with Fractions ★

What You'll Learn

- Compute unit rates when quantities are fractions
- Compare rates by finding each unit rate

Words to Know

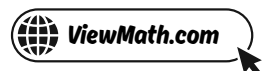
- ▶ **Unit Rate** — How much of one quantity for **one unit** of the other.
- ▶ **Reciprocal** — The “flipped” fraction — the reciprocal of $\frac{a}{b}$ is $\frac{b}{a}$.

How to Find a Unit Rate with Fractions

- 1 Write the rate as a **fraction**: $\frac{\text{first quantity}}{\text{second quantity}}$.
- 2 **Divide** by multiplying by the reciprocal (Keep–Change–Flip).
- 3 **Simplify** the result and label with units (“per one”).



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Example: A recipe uses $\frac{3}{4}$ cup of sugar for $\frac{1}{2}$ batch. How much sugar per batch?

Step 1 Write the rate: $\frac{\frac{3}{4} \text{ cup}}{\frac{1}{2} \text{ batch}}$

Step 2 Keep-Change-Flip: $\frac{3}{4} \times \frac{2}{1} = \frac{6}{4}$

Step 3 Simplify: $\frac{6}{4} = \frac{3}{2} = 1\frac{1}{2}$

✓ $1\frac{1}{2}$ cups per batch

Example: Who walks faster? Ana: $\frac{2}{3}$ mi in $\frac{1}{4}$ hr. Ben: $\frac{3}{4}$ mi in $\frac{1}{3}$ hr.

Step 1 Ana's rate: $\frac{\frac{2}{3}}{\frac{1}{4}}$ Ben's rate: $\frac{\frac{3}{4}}{\frac{1}{3}}$

Step 2 Ana: $\frac{2}{3} \times \frac{4}{1} = \frac{8}{3}$ Ben: $\frac{3}{4} \times \frac{3}{1} = \frac{9}{4}$

Step 3 Ana: $\frac{8}{3} = 2\frac{2}{3}$ mph Ben: $\frac{9}{4} = 2\frac{1}{4}$ mph

✓ Ana is faster ($2\frac{2}{3}$ mph > $2\frac{1}{4}$ mph).



“Per” means “for every one.” Always divide to find a unit rate!



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Unit Rates with Fractions Practice

Write the Rate

1. A painter covers $\frac{2}{3}$ wall in $\frac{1}{3}$ hr. Write as a fraction. _____
2. A faucet leaks $\frac{1}{2}$ cup in $\frac{3}{4}$ min. Write as a fraction. _____

Divide and Simplify

3. A painter covers $\frac{2}{3}$ wall in $\frac{1}{3}$ hr. How much wall per hour? _____
4. A faucet leaks $\frac{1}{2}$ cup in $\frac{3}{4}$ min. How many cups per minute? _____

Compare Unit Rates

5. A snail crawls $\frac{5}{8}$ m in $\frac{3}{4}$ hr. A beetle crawls $\frac{7}{10}$ m in $\frac{4}{5}$ hr. Which is faster? _____
6. A car uses $\frac{5}{6}$ gallon to travel $\frac{2}{3}$ mile. How many gallons per mile?

Answer: _____ gallons per mile



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CHAPTER

2

Operations with Rational Numbers

★ *What's Inside* ★

2.1 *Integers and Their Opposites* 7

★ 2.1 Integers and Their Opposites ★

What You'll Learn

- Identify integers, opposites, and absolute values on a number line
- Compare and order rational numbers using inequality symbols

Words to Know

- ▶ **Integer** — A whole number or its negative: $\dots, -3, -2, -1, 0, 1, 2, 3, \dots$
- ▶ **Opposite** — The same distance from 0 on the other side of the number line.
- ▶ **Absolute Value** — The distance from 0, written $|n|$. Always ≥ 0 .

How to Compare and Order Rational Numbers

- 1 Convert all numbers to the **same form** (decimals are usually easiest).
- 2 Place the numbers on a **number line** — left is less, right is greater.
- 3 Write the order using $<$ or $>$, or list from **least to greatest**.



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Example: Find the opposite and absolute value of -7 .

Step 1 -7 as a decimal is already -7.0 .

Step 2 -7 is 7 units left of 0. Its opposite (7) is 7 units right.

Step 3 Opposite: 7. Absolute value: $|-7| = 7$. Check: $-7 + 7 = 0$ ✓

✓ Opposite: 7 $|-7| = 7$

Example: Order from least to greatest: -1.5 , $\frac{3}{4}$, $-\frac{7}{4}$, 0.2 , -1

Step 1 Convert to decimals: -1.5 , 0.75 , -1.75 , 0.2 , -1 .

Step 2 On the number line, left to right: -1.75 , -1.5 , -1 , 0.2 , 0.75 .

Step 3 $-\frac{7}{4} < -1.5 < -1 < 0.2 < \frac{3}{4}$.

✓ $-\frac{7}{4}$, -1.5 , -1 , 0.2 , $\frac{3}{4}$



To compare fractions and decimals, convert them all to decimals first. It makes ordering much easier!



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Integers and Their Opposites Practice (VA)

Convert to the Same Form

1. Write $-\frac{2}{3}$ as a decimal. _____

2. Write 0.25 as a fraction. _____

Compare Using $<$, $>$, or $=$

3. $-\frac{2}{3}$ _____ -0.5

4. $|-3|$ _____ $|2|$

Order from Least to Greatest

5. $\frac{1}{2}$, -0.75 , $-\frac{1}{4}$, 0.3 , -1

6. A football team gains 6 yards, then loses 6 yards. Use integers to show the result. What is the opposite of -6 ?

Answer: _____ yards



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THANK YOU

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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*

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