

# Pennsylvania Keystone Grade 9 Math Quizzes

*Quick Topic Assessments with Answer Key*

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QUICK QUIZZES FOR EVERY TOPIC

# Algebra 1 Math Quizzes

Topic Quizzes • Chapter Reviews • Answer Key

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*Quick, focused quizzes are one of the best ways to find out what you really know — and what you still need to work on.*

*This book has a short quiz for every Algebra 1 topic. Each one takes about 10–15 minutes and covers the most important skills for that section. Take a quiz, score it, and see exactly where you stand.*

*Use it after studying a topic, the night before a test, or anytime you want a fast check-in on your algebra skills.*



## Take the Quiz

*10–15 minutes  
per quiz*



## Score It

*Check every answer  
in the key*



## Review & Retry

*Study what you missed  
then quiz again*

# How to Use This Book

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## 1 *Pick a topic you've been studying*

*Look through the table of contents and find the quiz that matches the topic you just covered in class or in your study guide.*

## 2 *Set a timer for 10–15 minutes*

*Give yourself a reasonable time limit. Working with a timer helps you build speed and stay focused — just like a real test.*

## 3 *Answer every question*

*Try each problem. If you get stuck, skip it and come back at the end. Don't leave any question blank — a good guess is better than no answer.*

## 4 *Check your answers*

*Use the answer key in the back. Mark each question right or wrong. Write your score on the quiz page and track your progress over time.*

## 5 *Review what you missed*

*Go back to the problems you got wrong. Read the topic explanation, study the method, then try the quiz again in a few days. Your score should improve every time.*

# Track Your Scores

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Every quiz in this book has a **Name / Date / Score** bar at the top. After you finish a quiz, check your answers using the answer key in the back, then write your score on that bar.

## ★ How to Track Your Progress

- 1 Write your score on the quiz page right after you grade it.
- 2 Circle any quiz where you scored below 70 %.
- 3 Review the topic, then retake the quiz in a few days.
- 4 Compare your scores — you'll see improvement every time!

💡 *Tip: Your score should go up every time you retake a quiz. That's how you know you're learning!*

✎ Use the score bar on each quiz page to record your results.

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CHAPTER

1

# Foundations of Algebra

## ★ What's Inside ★

1.1 Classifying Real Numbers .....	2
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## ★ 1.1 Classifying Real Numbers ★

### 🎯 Learning Goals

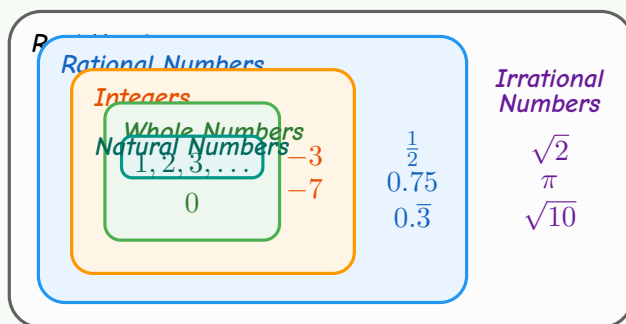
- Classify numbers as natural, whole, integer, rational, or irrational
- Know that rational decimals terminate or repeat

### 🎓 Number Subsets

Every number you use belongs to at least one of these groups:

- **Natural numbers:** 1, 2, 3, ... (counting numbers)
- **Whole numbers:** 0, 1, 2, 3, ... (naturals plus zero)
- **Integers:** ..., -2, -1, 0, 1, 2, ... (whole numbers and negatives)
- **Rational numbers:** any number that equals  $\frac{a}{b}$  where  $a, b$  are integers and  $b \neq 0$
- **Irrational numbers:** decimals that never end and never repeat ( $\sqrt{2}, \pi$ )

These sets nest like rings.  $\text{Natural} \subset \text{Whole} \subset \text{Integer} \subset \text{Rational}$ . Rational and Irrational together make the **real numbers**.



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## Classifying Numbers

Place each number in all groups that fit.

1. 7 — Natural, Whole, Integer, Rational ( $\frac{7}{1}$ ), Real
2. 0 — Whole, Integer, Rational ( $\frac{0}{1}$ ), Real
3.  $-3$  — Integer, Rational ( $\frac{-3}{1}$ ), Real
4.  $\frac{2}{5} = 0.4$  — Rational (terminates), Real
5.  $\sqrt{3} = 1.7320\dots$  — Irrational (never repeats), Real



“ Every integer is rational! Just write it over 1. For example,  $-5 = \frac{-5}{1}$ . ”

### Rational Numbers

- Written as  $\frac{a}{b}$ ,  $b \neq 0$
- Decimals terminate or repeat
- Examples:  $\frac{3}{4}$ ,  $-2$ ,  $0.\bar{6}$

### Irrational Numbers

- Cannot be written as  $\frac{a}{b}$
- Decimals never terminate or repeat
- Examples:  $\sqrt{2}$ ,  $\pi$ ,  $\sqrt{10}$

## Classifying Real Numbers

1. Classify  $-12$ : natural, whole, integer, rational, or irrational?
2. Is  $\sqrt{25}$  rational or irrational?
3. Is  $\sqrt{7}$  rational or irrational?
4. Write  $0.\bar{3}$  as a fraction.
5. All whole numbers are integers.

True  False



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CHAPTER

2

# Introduction to Functions

## ★ What's Inside ★

2.1 What Is a Function? .....	5
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## ★ 2.1 What Is a Function? ★

### 🎯 Learning Goals

- Decide whether a relation is a function
- Use the vertical line test on graphs

### 🎓 What Is a Function?

A **relation** is any set of ordered pairs  $(x, y)$ .

A **function** is a special relation where every input  $(x)$  gives exactly one output  $(y)$ . No  $x$ -value may repeat with a different  $y$ -value.

Think of a vending machine. Press button **A3**, you always get the same snack. If one button gave a random item each time, that machine would not be a function!

Ways to show a relation: ordered pairs, table, graph, mapping diagram, or equation.

### ✏️ Checking a Table

Is this relation a function?

$x$	1	2	3	1
$y$	5	8	10	7

The input  $x = 1$  maps to both 5 and 7. One input gives two outputs, so this is **not a function**.



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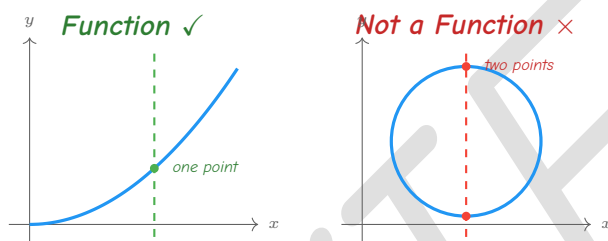


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## The Vertical Line Test

- 1 Draw or look at the graph of the relation.
- 2 Imagine sliding a vertical line across the graph from left to right.
- 3 If the vertical line ever hits the graph in **two or more points** at the same time, it is **not** a function.
- 4 If every vertical line hits at most one point, it **is** a function.



“ A function is like a rule: one question, one answer. If one input gives two answers, it breaks the rule! ”



**TIP**

In a mapping diagram, each input arrow must point to exactly one output. An input with two arrows means it is not a function.

## What Is a Function?

1. A relation has the pairs  $(2, 4)$ ,  $(3, 6)$ ,  $(4, 8)$ ,  $(5, 10)$ . Is it a function?
2. A relation has the pairs  $(1, 3)$ ,  $(2, 5)$ ,  $(1, 7)$ . Is it a function?
3. A circle is drawn on a coordinate plane. Does it pass the vertical line test?
4. Every function is a relation. True  False
5. A mapping diagram shows  $3 \rightarrow 9$ ,  $4 \rightarrow 16$ ,  $5 \rightarrow 25$ . Is it a function?



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# *Answer Key & Explanations*



## Answer Key

First try each quiz on your own, then check your work here.

Integer, Rational

Rational

Irrational

$\frac{1}{3}$

True

Yes

No

No

True

Yes

### Explanations

$-12$  is negative, so not natural or whole. It is an integer. Since  $-12 = \frac{-12}{1}$ , it is also rational.

$\sqrt{25} = 5$ , a whole number. Every integer is rational:  $5 = \frac{5}{1}$ .

$7$  is not a perfect square. So  $\sqrt{7}$  is a non-repeating, non-terminating decimal.

$0.\bar{3} = 0.333\dots$ . The repeating decimal equals  $\frac{1}{3}$ , which is rational.

Each input appears only once. Every  $x$ -value maps to exactly one  $y$ -value, so it is a function.

The input  $x = 1$  maps to both  $3$  and  $7$ . One input gives two outputs, so it is not a function.

A vertical line through the middle of a circle hits it at two points. So a circle is not a function.

Each input maps to exactly one output. No input is repeated, so it is a function.



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***Well done checking your answers!***

*Keep practicing to strengthen your skills.*

PREVIEW



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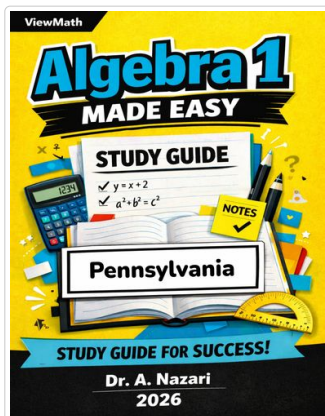


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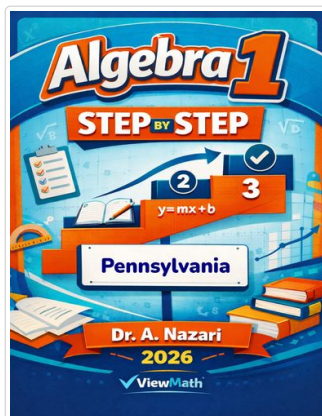
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Study Guide



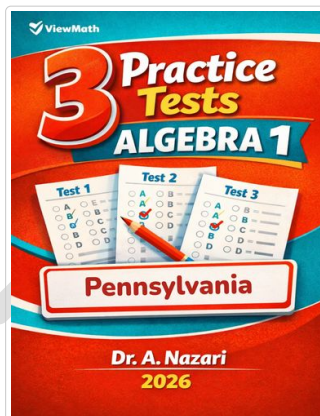
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Step-by-Step



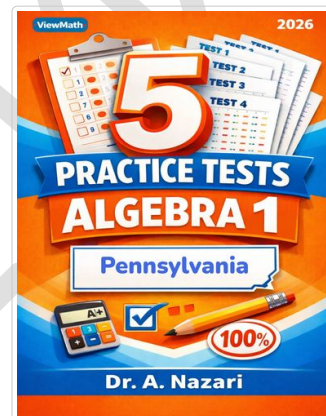
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3 Practice Tests



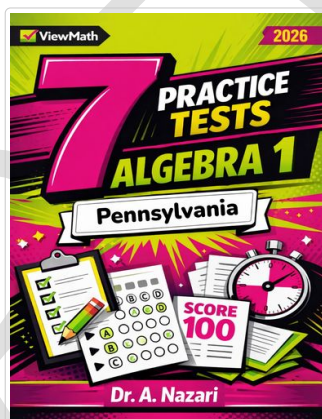
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5 Practice Tests



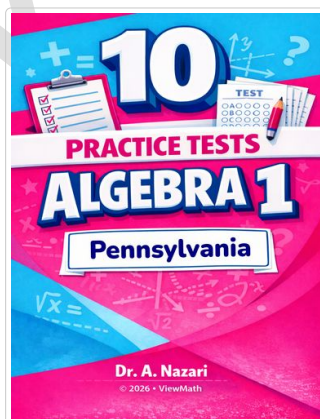
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7 Practice Tests



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10 Practice Tests



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