

Iowa ISASP Grade 9 Math Made Easy

Study Guide with Key Concepts, Review & Practice

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

YOUR ALGEBRA 1 STUDY GUIDE

Math Made Easy

Key Concepts • Worked Examples • Practice with Answers

Algebra 1 is the foundation of all higher mathematics. This study guide covers every key concept you need — from real numbers and exponents through linear and quadratic functions, systems of equations, polynomials, exponential models, and data analysis.

Each topic is explained simply, backed by worked examples, and followed by focused practice with a full answer key. Use it to learn new ideas, review before a test, or fill in gaps any time.

 **37 Topics Across 9 Chapters**

Real numbers, linear equations, functions, systems, polynomials, quadratics, exponentials, and statistics — every Algebra 1 standard.

 **Clear Explanations & Worked Examples**

Every concept is broken down step by step with real examples so you understand the why, not just the how.

 **Practice with Every Topic**

Short, focused problem sets after each lesson let you test your understanding immediately.

 **Complete Answer Key**

Every practice problem has a detailed answer and explanation in the back of the book.

© 2026 Dr. A. Nazari • ViewMath.com



Get Online



Find more at
ViewMath.com/IA-Algebra1



How to Use This Study Guide

Four steps to master every topic.

1

Read the Concept Box

Each topic starts with a clear explanation of the key idea or formula. Read it carefully — this is the foundation for everything that follows. Underline anything you want to remember.

2

Study the Worked Examples

Worked examples show you exactly how to apply the concept step by step. Cover the solution, try it yourself first, then compare. That one extra effort makes the method stick.

3

Solve the Practice Problems

After each explanation, a short set of problems tests your understanding. Work them on paper — writing out every step is the fastest way to learn.

4

Check Answers and Fix Mistakes

Flip to the Answer Key and mark your work. For any mistake, re-read the explanation and try again. Mistakes show you exactly where to focus next.



Study Plan Ideas

- **Daily:** One topic per day (15–25 minutes).
- **Weekly:** Review the week's concepts each Friday.
- **Before a test:** Re-do any problems you got wrong.



Tips for Parents & Teachers

- Use the guide alongside classroom lessons for extra support.
- Review mistakes together — focus on understanding, not just answers.
- Praise effort and persistence over speed or scores.

Algebra Quick Reference

Key formulas and facts for Algebra 1 – tear out or bookmark this page.

Exponent Rules

$$a^m \cdot a^n = a^{m+n}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$(a^m)^n = a^{mn}$$

$$a^0 = 1 \quad (a \neq 0)$$

$$a^{-n} = \frac{1}{a^n}$$

Systems of Equations

Substitution: Solve one equation for a variable, plug into the other.

Elimination: Add/subtract equations to cancel a variable.

One solution: lines cross

No solution: parallel lines

Infinite: same line

Slope & Linear Equations

$$\text{Slope: } m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{rise}}{\text{run}}$$

$$\text{Slope-intercept: } y = mx + b$$

$$\text{Point-slope: } y - y_1 = m(x - x_1)$$

$$\text{Standard: } Ax + By = C$$

Parallel: same slope

$$\text{Perpendicular: } m_1 \cdot m_2 = -1$$

Functions

A function maps each input to exactly one output.

$f(x)$ means "the output for input x "

Domain: set of all inputs

Range: set of all outputs

Vertical line test: if a vertical line hits the graph twice, it's not a function.

Algebra Quick Reference

Continued

Factoring Polynomials

GCF first, always.

$$a^2 - b^2 = (a + b)(a - b)$$

$$a^2 + 2ab + b^2 = (a + b)^2$$

$$a^2 - 2ab + b^2 = (a - b)^2$$

$$x^2 + bx + c = (x + p)(x + q)$$

where $p + q = b$ and $pq = c$

Quadratic Functions

Standard: $f(x) = ax^2 + bx + c$

Vertex: $f(x) = a(x - h)^2 + k$

Axis of symmetry: $x = -\frac{b}{2a}$

Vertex: $\left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$

$a > 0$: opens up $a < 0$: opens down

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Discriminant: $\Delta = b^2 - 4ac$

$\Delta > 0$: two real solutions

$\Delta = 0$: one real solution

$\Delta < 0$: no real solutions

Exponential Functions

$$f(x) = a \cdot b^x$$

a = initial value (y-intercept)

$b > 1$: growth $0 < b < 1$: decay

Growth rate: $r = b - 1$






Arithmetic seq: $a_n = a_1 + (n - 1)d$

Geometric seq: $a_n = a_1 \cdot r^{n-1}$

Take Your Learning Online with ViewMath Academy!

For Parents, Teachers & Students

Love what you're reading? ViewMath Academy is your **free online companion** to this book — practice what you learn, track your progress, and master every topic!

-  **Topic Quizzes** — Test yourself on each topic right after you study it in this book
-  **Interactive Lessons** — Revisit any concept with online lessons that match each chapter
-  **Progress Tracking** — Watch your mastery grow as you work through the book
-  **Adaptive Practice** — Get more questions on topics where you need extra help
-  **Practice Tests** — When you're ready, take a full practice test and analyze your score online



Scan to visit ViewMath Academy

[ViewMath.com/IA-Algebra1](https://www.viewmath.com/IA-Algebra1)

 Free to use • No downloads required • Works on any device



CHAPTER

1

Foundations of Algebra

★ What's Inside ★

1.1 Classifying Real Numbers	2
------------------------------------	---



★ 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:** $1, 2, 3, \dots$ (counting numbers)
- **Whole numbers:** $0, 1, 2, 3, \dots$ (naturals plus zero)
- **Integers:** $\dots, -2, -1, 0, 1, 2, \dots$ (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**.

✏️ 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



Get Online



Find more at
[ViewMath.com/IA-Algebra1](https://www.viewmath.com/IA-Algebra1)





“ 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: $\sqrt{2}$, π , $\sqrt{10}$

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



Get Online



Find more at
[ViewMath.com/IA-Algebra1](https://www.viewmath.com/IA-Algebra1)



CHAPTER

2

Introduction to Functions

★ What's Inside ★

2.1 What Is a Function?	5
-------------------------------	---



★ 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**.



Get Online

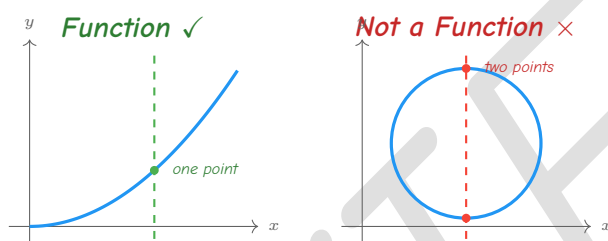


Find more at
[ViewMath.com/IA-Algebra1](https://www.viewmath.com/IA-Algebra1)



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?



Find more at
[ViewMath.com/IA-Algebra1](https://www.viewmath.com/IA-Algebra1)



Answer Key



Answer Key

Try each problem on your own first, then check your work here.

Chapter 1

> Section 1.1

1 Integer, Rational

2 Rational

3 Irrational

4 $\frac{1}{3}$

5 True

Explanations

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

2 $\sqrt{25} = 5$, a whole number. Every integer is rational: $5 = \frac{5}{1}$.

3 7 is not a perfect square. So $\sqrt{7}$ is a non-repeating, non-terminating decimal.

4 $0.\overline{3} = 0.333\dots$. The repeating decimal equals $\frac{1}{3}$, which is rational.

Chapter 2



Get Online



Find more at
[ViewMath.com/IA-Algebra1](https://www.viewmath.com/IA-Algebra1)



[> Section 2.1](#)

1 Yes

2 No

3 No

4 True

5 Yes

 **Explanations**

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

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

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

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



Well done checking your answers!

Keep practicing to strengthen your skills.



Get Online

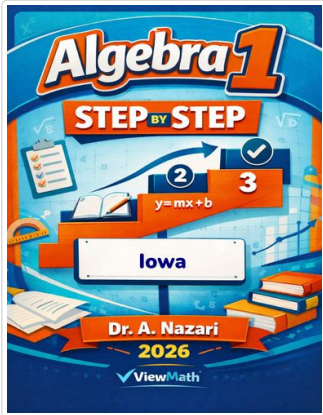


Find more at
[ViewMath.com/IA-Algebra1](https://www.viewmath.com/IA-Algebra1)

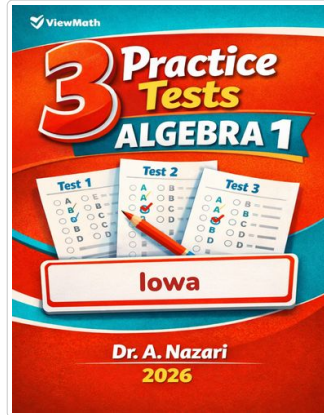


 **Great Job! Keep Learning with ViewMath!**

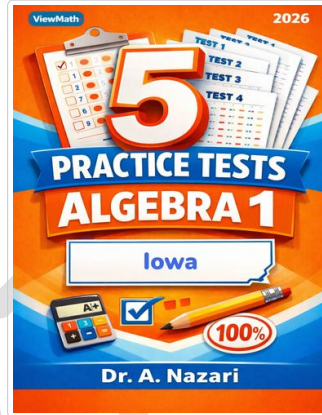
Keep up the great work! Visit viewmath.com/IA-Algebra1 for free lessons, quizzes, and more.



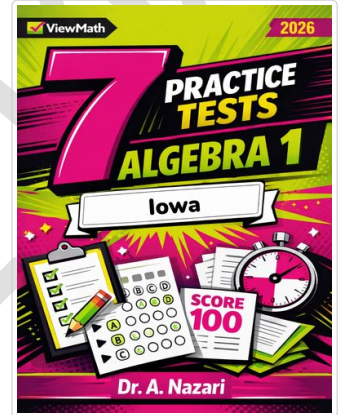
Step-by-Step



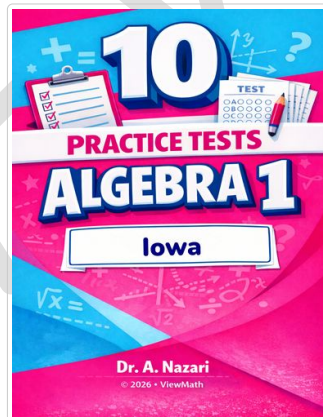
3 Practice Tests



5 Practice Tests



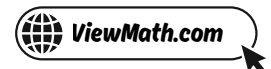
7 Practice Tests



10 Practice Tests



Find more at ViewMath.com/IA-Algebra1



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!