

Virginia SOL Algebra 2 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 2 STUDY GUIDE

Math Made Easy

Functions • Advanced Algebra • Modeling • Practice with Answers

Algebra 2 connects the algebra you already know to the function families used in advanced math, science, finance, and data. This guide reviews equations, functions, quadratics, polynomials, rational and radical expressions, exponential and logarithmic models, sequences, trigonometry, conics, statistics, probability, and financial applications.

Each topic is short and built for review: read the key idea, study the examples, try the practice, then check the answer explanations.

Complete Review

15 chapters cover the major Algebra 2 skills and state pathways.

Worked Examples

Key ideas and examples come before each short practice set.

Built-in Practice

Every topic ends with quick questions for immediate review.

Answer Support

Final answers include explanations for correcting mistakes.

How to Use This Study Guide

A practical path for review, homework support, and test prep.

1

Start with the Learning Goals

Each topic begins by naming what you should be able to do. Use those goals as a checklist before and after you study the lesson.

2

Work Through the Examples

Algebra 2 problems often combine several skills. Read each worked example slowly, then cover the solution and try the same steps on your own paper.

3

Practice Immediately

Do the practice problems before moving on. Write the algebra, graph, table, or explanation that supports your answer; mental math alone is rarely enough for Algebra 2 tests.

4

Use Mistakes as a Study Map

Check the answer explanations. If you missed a problem, label the reason: vocabulary, setup, algebra, graph reading, calculator use, or careless error.

Study Plan Ideas

- **Quick review:** Read one topic and solve its practice set.
- **Chapter review:** Rework the examples and redo missed practice.
- **Before a test:** Review the quick reference, then focus on weak topics.

For Parents & Teachers

- Use topic names to match classroom lessons or state standards.
- Ask students to explain the method, not just report the answer.
- Keep a short error log so review time targets the right skills.

Algebra 2 Quick Reference

Key formulas and facts to bookmark while you study.

Function Features

Domain: allowed inputs.

Range: possible outputs.

Average rate of change:

$$\frac{f(b) - f(a)}{b - a}$$

Transformations:

$f(x) + k$, $f(x - h)$, $af(x)$, $f(bx)$.

Polynomials

Remainder Theorem: remainder from division by $x - a$ is $f(a)$.

Factor Theorem: $x - a$ is a factor exactly when $f(a) = 0$.

End behavior comes from degree and leading coefficient.

Quadratics

Standard: $ax^2 + bx + c$

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

Factored: $a(x - r_1)(x - r_2)$

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

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

Rational Expressions

Factor first, then cancel common factors.

Excluded values come from the original denominator.

Vertical asymptotes often come from denominator zeros that do not cancel.

Holes come from factors that cancel.

Algebra 2 Quick Reference

Continued

Radicals & Exponents

$$a^{m/n} = \sqrt[n]{a^m}$$

For even roots, keep real-domain restrictions in mind.

To solve radical equations, isolate the radical, raise both sides to a power, and check.

Sequences & Series

$$\text{Arithmetic: } a_n = a_1 + (n - 1)d$$

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

Finite geometric sum:

$$S_n = \frac{a_1(1 - r^n)}{1 - r}, r \neq 1.$$

Exponential & Logarithmic

$y = ab^x$ has initial value a and base b .

$\log_b(x) = y$ means $b^y = x$.

Product: $\log_b(MN) = \log_b M + \log_b N$

Power: $\log_b(M^p) = p \log_b M$.

Trigonometry & Data

Unit circle: $(\cos \theta, \sin \theta)$.

$$\sin^2 \theta + \cos^2 \theta = 1$$






Residual: actual value – predicted value.

Strong models have residuals with no clear pattern.

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/VA-Algebra2

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



CHAPTER

1

Algebra 2 Foundations

★ *What's Inside* ★

1.1	<i>Real Number System and Set Notation</i>	2
-----	--	---

1.1 Real Number System and Set Notation

The real number system is a way to organize every number on the number line. Some groups sit inside larger groups, so one number can belong to several sets at the same time.

Key Point

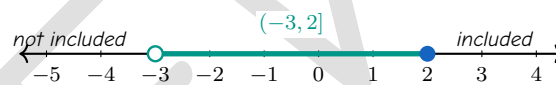
A **rational** number can be written as $\frac{a}{b}$, where a and b are integers and $b \neq 0$. Its decimal either terminates or repeats. An **irrational** number is real, but cannot be written as a ratio of integers; its decimal never terminates and never repeats.

$$\text{natural} \subset \text{whole} \subset \text{integers} \subset \text{rational} \subset \text{real}$$

Use the smallest accurate category when describing one number. Use interval or set-builder notation when describing many numbers at once.

Key Point

Set-builder notation gives a rule: $\{x \mid x \geq -2\}$. Interval notation shows the same set on the number line: $[-2, \infty)$. Brackets include endpoints, parentheses exclude endpoints, and ∞ always uses a parenthesis.



Example

Classify $\sqrt{49}$ as precisely as possible.

Since $\sqrt{49} = 7$, the smallest set is natural. It is also whole, integer, rational, and real, but "natural" is the most precise description.

Answer: natural

Example

Write $\{x \mid -3 < x \leq 2\}$ in interval notation.

The values are between -3 and 2 . The left endpoint is not included, and the right endpoint is included.

Answer: $(-3, 2]$



Find more at
ViewMath.com/VA-Algebra2



 **Practice**

1. Classify $\sqrt{36}$ as rational or irrational.
2. Decide whether $0.3131131113\dots$ is rational or irrational.
3. Write $\{x \mid x \leq 4\}$ in interval notation.

PREVIEW



Get Online



Find more at
[ViewMath.com/VA-Algebra2](https://www.viewmath.com/VA-Algebra2)



CHAPTER

2

Functions, Transformations, and Inverses

★ *What's Inside* ★

2.1	<i>Function Notation and Evaluation</i>	5
-----	---	---

2.1 Function Notation and Evaluation

A function is an input-output rule. Function notation gives the rule a name, so $f(3)$ means “the output of function f when the input is 3.”

Key Point

The expression $f(a)$ is not multiplication. To evaluate it from a formula, replace every input variable with a , use parentheses for negative inputs or expression inputs, and then simplify.

Functions can also be shown by tables, graphs, and contexts. In every form, the input is the value you start with and the output is the value the function returns.

Key Point

From a table or graph, read the output paired with the input. From a context, include the meaning and units of the output so the value is not just a number.

Example

Let $p(x) = x^2 - 4x + 6$. Find $p(-2)$.

Substitute -2 for every x :

$$p(-2) = (-2)^2 - 4(-2) + 6 = 4 + 8 + 6 = 18.$$

Answer: 18

Example

Use the table to find $g(2)$ and the input where $g(x) = 9$.

x	-1	0	2	5
$g(x)$	7	4	-2	9

The input 2 is paired with output -2 , so $g(2) = -2$. The output 9 occurs when the input is 5.

Answer: $g(2) = -2$; input 5

Practice

1. Let $f(x) = 2x - 5$. Find $f(7)$.
2. Let $g(t) = t^2 + 3$. Find $g(-4)$.



Get Online



Find more at
[ViewMath.com/VA-Algebra2](https://www.viewmath.com/VA-Algebra2)



3. A ride costs $C(m) = 4 + 2.50m$ dollars for m miles. Find and interpret $C(8)$.

PREVIEW



Get Online



Find more at
[ViewMath.com/VA-Algebra2](https://www.viewmath.com/VA-Algebra2)



Answer Key



Chapter 1

Section 1.1 Real Number System and Set Notation

[Answer Key](#)

Answers

- 1 rational 2 irrational 3 $(-\infty, 4]$

Explanations

- 1 First simplify the square root: $\sqrt{36} = 6$. Any whole number can be written as a fraction, such as $6 = \frac{6}{1}$, so it is rational.
- 2 A rational decimal either stops or repeats the same block forever. Here the groups of 1's keep changing, so there is no fixed repeating block.
- 3 The rule $x \leq 4$ means all numbers to the left of 4, including 4 itself. Infinity always uses a parenthesis, and 4 uses a bracket.

Chapter 2

Section 2.1 Function Notation and Evaluation

[Answer Key](#)

Answers

- 1 9 2 19 3 24 dollars

Explanations

- 1 Substitute 7 for x : $f(7) = 2(7) - 5 = 9$. Careful substitution keeps the order of operations clear and gives 9.
- 2 Use parentheses: $g(-4) = (-4)^2 + 3 = 19$. So the result is 19.
- 3 The ride costs $4 + 2.50(8) = 24$ dollars for 8 miles. So the answer is 24 dollars.



Get Online

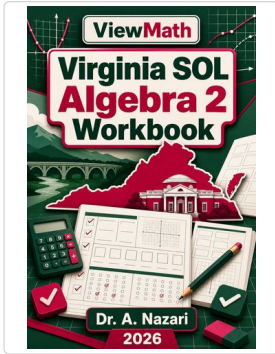


Find more at
[ViewMath.com/VA-Algebra2](https://www.viewmath.com/VA-Algebra2)



Great Job! Keep Learning with ViewMath!

Keep up the great work! Visit viewmath.com/VA-Algebra2 for free lessons, quizzes, and more.



Workbook



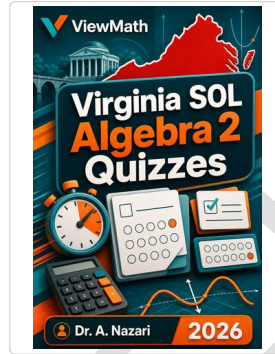
Scan Me



Step-by-Step



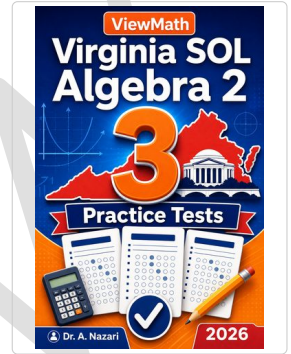
Scan Me



Quizzes



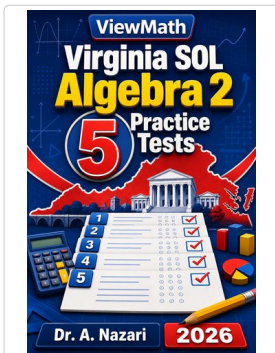
Scan Me



3 Practice Tests



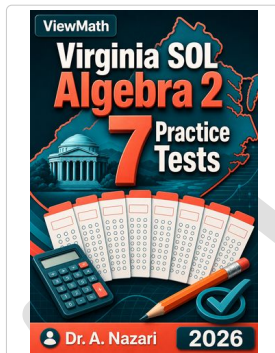
Scan Me



5 Practice Tests



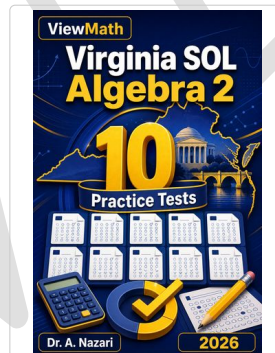
Scan Me



7 Practice Tests



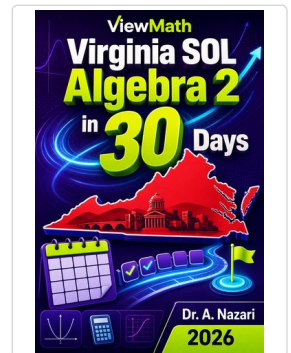
Scan Me



10 Practice Tests



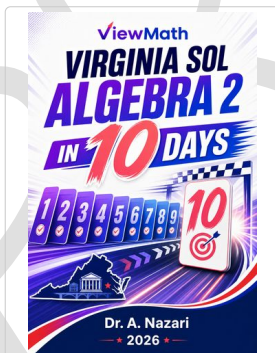
Scan Me



Math in 30 Days



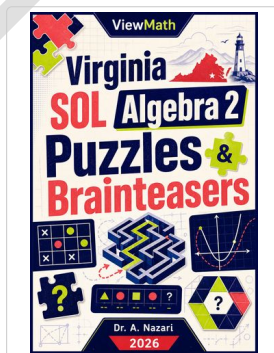
Scan Me



Math in 10 Days



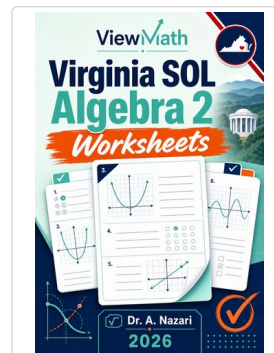
Scan Me



Puzzles



Scan Me



Worksheets



Scan Me



Find more at [ViewMath.com/VA-Algebra2](https://viewmath.com/VA-Algebra2)

