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ACT® Math

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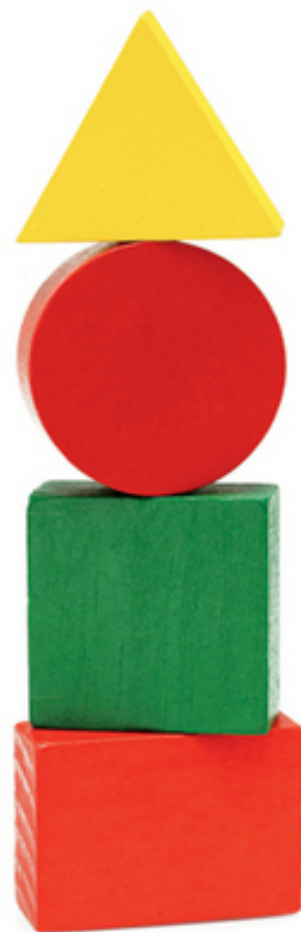
DUMMIES®

Learn to:

- Score high on the mathematics section of the ACT
- Prepare for exam day with helpful tips and strategies
- Grasp algebra, geometry, and trigonometry
- Take three practice tests modeled from questions off the latest ACT tests

Mark Zegarelli

Math tutor and author of SAT Math For Dummies



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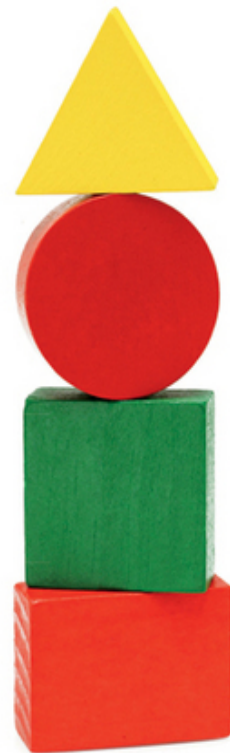
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ACT[®] Math For Dummies[®]

Visit www.dummies.com/cheatsheet/actmath to view this book's cheat sheet.

Table of Contents

[Introduction](#)

[About This Book](#)

[Conventions Used in This Book](#)

[Foolish Assumptions](#)

[How This Book Is Organized](#)

[Part I: Getting into the Act: An Overview of ACT Math Basics](#)

[Part II: Building Your Pre-Algebra and Elementary Algebra Skills](#)

[Part III: Digging In to Intermediate Algebra and Coordinate Geometry](#)

[Part IV: Visualizing Plane Geometry and Trigonometry](#)

[Part V: Tracking Your Progress with Practice Tests](#)

[Part VI: The Part of Tens](#)

[Icons Used in This Book](#)

[Where to Go from Here](#)

Part I: Getting into the Act: An Overview of ACT Math Basics

Chapter 1: Reviewing ACT Math Basics

Getting an Overview of ACT Math
Taking Four Key Steps to ACT Success

Sharpening your basic math skills
Getting comfortable with your calculator
Solidifying your ACT-specific math skills
Taking practice tests under timed conditions

What Should I Study? Knowing What's on the ACT

Taking care of the basics in pre-algebra
Moving on to elementary algebra
Focusing on intermediate algebra
Working with coordinate geometry
Reviewing plane geometry
Dealing with trigonometry and other advanced topics

You're Off the Hook: Discovering What the ACT Doesn't Cover

Chapter 2: Boosting Your Test-Taking Skills

Two-Timing the Test: Taking Two Passes to Answer Questions
To Guess or Not to Guess

Answering Multiple-Choice Questions

Considering the five answer choices
Plugging and playing

Calculating Your Way to Success: Calculators and the ACT

When should I use a calculator?
What kind of calculators can I use?
What kind of calculators can't I use?
How do I use my calculator?

Chapter 3: Discovering Some Problem-Solving Strategies

Identifying Basic Math Skills You Need to Know

Knowing how the four basic operations operate
Keeping your negatives straight
Evaluating with the order of operations
Making peace with fractions

Getting Comfortable with Formulas

Reviewing the formulas you need to know
Working with your arsenal of formulas

Sorting Through Word Problems

Jotting down the numbers

Sketching out problem information

Part II: Building Your Pre-Algebra and Elementary Algebra Skills

Chapter 4: Starting with the Basics: Pre-Algebra

Getting Back to Basics: Answering Basic Arithmetic Questions

Reviewing the four basic operations

Following along with number sequences

Checking out inequalities

Evaluating a number's absolute value

Understanding Factors and Multiples

Finding factors

Generating lists of multiples

Perfecting Your Knowledge of Percents

Knowing basic percent conversions

Taking advantage of a quick trick for calculating some percents

Calculating straightforward percent problems

Untangling complex percent problems

Handling the ups and downs of percent increase and decrease

Using Ratios and Proportions to Compare Quantities

Working with Powers and Square Roots

Harnessing the power of exponents

Be square: Squaring and square roots

Real-World Math: Studying Statistics

Presenting data in tables and graphs

Getting a better-than-average grasp of averages

Looking at Likelihood: Probability

Learning to count

Determining probability

Chapter 5: It's Elementary Algebra, My Dear Watson

Knowing the Two Big Ideas of Algebra

Every step you take: Keeping equations balanced

Walkin' a lonely road: Isolating the variable

Discovering Six Choice Words about Algebra

Express Yourself: Working with Algebraic Expressions

Evaluating expressions

Simplifying expressions

Factoring expressions

Solving Everything but the Kitchen Sink

Approaching rational equations rationally

Rooting out ways to solve square root equations

Gaining absolute confidence with absolute value

Exposing variables in the exponent

Taking extra care with extra variables

Lost in Translation: Translating Words into Equations

Chapter 6: Practice Problems for Pre-Algebra and Elementary Algebra

Practice Problems

Solutions to Practice Problems

Part III: Digging In to Intermediate Algebra and Coordinate Geometry

Chapter 7: Moving to Intermediate Algebra

Knowing More or Less about Inequalities

Becoming a pro at inequalities

Separate but unequal: Solving inequalities with absolute value

Beating the System: Dealing with Systems of Equations

Solving systems of equations systematically

Working word problems using a system of equations

Keeping Things in Proportion: Direct and Inverse Proportionality

Maintaining a balance with direct proportions

Turning things around with inverse proportions

Working with Quadratic Equations and the Roots of Polynomials

Factoring to solve quadratic equations

Choosing the quadratic formula when all else fails

Making Connections with Functions

Using functions as models

Defining relationships with functional notation and evaluation

Getting to know domain and range

Chapter 8: Coordinating a Path through Coordinate Geometry

Reviewing Some Basics of Coordinate Geometry

Graphing Linear Functions

[Lining up some line segment skills](#)
[Measuring the slope of a line](#)
[Applying the slope-intercept form](#)
[Working with parallel and perpendicular lines](#)

[Giving Your Quads a Workout: Graphing Quadratic Functions](#)

[Searching for the qualities of a quadratic](#)
[Calculating two features of parabolas](#)
[Solving and graphing quadratic inequalities](#)

[Recognizing Three Transformations](#)

[Reversing graphs with reflections](#)
[Movin' on up \(or down\): Vertical shift](#)
[Shifting horizontally](#)

[Taking on Advanced Equations](#)

[Raising the bar with higher-order polynomials](#)
[Going 'round and 'round with circles](#)

[Chapter 9: Practice Problems for Intermediate Algebra and Coordinate Geometry](#)

[Intermediate Algebra and Coordinate Geometry Practice Problems](#)
[Solutions to Intermediate Algebra and Coordinate Geometry Practice Problems](#)

Part IV: Visualizing Plane Geometry and Trigonometry

Chapter 10: Plain Talk about Plane Geometry

Knowing Your Angles

Angles around one point

Angles and parallel lines

Interior angles in a polygon

Working with Triangles

Finding the area of a triangle

Answering questions containing right triangles

Breezing through Your Work with Quadrilaterals

Squares

Rectangles

Parallelograms

Trapezoids

Wheeling and Dealing with Circles

Rounding up the basic circle formulas

Understanding tangent lines

Making sense of arc length

Striking a few chords

Examining Solid Geometry

Focusing on cubes and boxes
Incorporating spheres into your
geometric repertoire
Figuring the volume of other solids
(prisms, cylinders, pyramids, and cones).

Chapter 11: Trig and Beyond: ACT Advanced Math Topics

Trigonometry: Watching the Sines and Taking a Few Tangents

Picking out the opposite, the adjacent,
and the hypotenuse
Knowing how to SOH CAH TOA
Feeling radiant with radian measure
Graphing trig functions
Identifying trig identities

Reloading the Matrix

Adding and subtracting matrices
Making sense of matrix multiplication
Determining the meaning of
determinants

Logging Some Hours with Logarithms
Imagining the Possibilities with Imaginary
Numbers

Chapter 12: Practice Problems for Geometry, Trig, and Advanced Math

[Geometry, Trig, and Advanced Math Practice Problems](#)

[Solutions to Geometry, Trig, and Advanced Math Practice Problems](#)

[Part V: Tracking Your Progress with Practice Tests](#)

[Chapter 13: Practice Test 1](#)

[Mathematics Test Answer Sheet](#)

[Mathematics Test](#)

[Chapter 14: Practice Test 1: Answers and Explanations](#)

[Mathematics Test](#)

[Answer Key for Practice Test 1](#)

[Chapter 15: Practice Test 2](#)

[Mathematics Test Answer Sheet](#)

[Mathematics Test](#)

[Chapter 16: Practice Test 2: Answers and Explanations](#)

[Mathematics Test](#)

[Answer Key for Practice Test 2](#)

[Chapter 17: Practice Test 3](#)

[Mathematics Test Answer Sheet](#)

[Mathematics Test](#)

Chapter 18: Practice Test 3: Answers and Explanations

Mathematics Test

Answer Key for Practice Test 3

Part VI: The Part of Tens

Chapter 19: Ten Key Differences Between the ACT and the SAT

Number of Math Tests

Test Organization

Presence of the “It Doesn’t Count” Section

Existence of Grid-In Questions

Penalty for Wrong Answers

Answer Choice Format

Amount of Advanced Math

Length of Word Problems

The Number of Problems You Should Probably

Skip

Requirements Regarding the Writing Test

Chapter 20: Ten Items to Check Off before Taking the ACT

I Received My ACT Admission Ticket, and I Put It in a Safe Place

I’m 100 Percent Sure about the Date and Time of My ACT

I Know How to Get There, Too

I Purchased the Calculator I Intend to Use

I Feel Comfortable Using My Calculator

I Have a Backpack All Ready to Go by the Door

I Picked Out My Clothes for the Morning

I'm Having a Relaxing Night before the Test

The Alarm Is Set for an Early Rise

I'm Focusing on My Breathing

Cheat Sheet

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ACT[®] Math For Dummies[®]

by Mark Zegarelli



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About the Author

Mark Zegarelli is the author of *Basic Math and Pre-Algebra For Dummies* (Wiley), *SAT Math For Dummies* (Wiley), and five other books on basic math, calculus, and logic. He holds degrees in both English and math from Rutgers University and is a math tutor and teacher.

Mark lives in San Francisco, California, and Long Branch, New Jersey.

Dedication

For my good friend David Feaster — as always, with love, laughter, and light.

Author's Acknowledgments

This is my seventh *For Dummies* book, and my seventh positive experience working with a first-rate team of editors who make the process of writing so very pleasurable and productive. Thanks so much to my Wiley editors Chrissy Guthrie, Jessica Smith, and Lindsay Lefevere. More thanks to technical editors Sarah Weaver and Amy Nicklin for keeping me on track, accurate, and finely tuned to the needs of readers who are studying for the ACT.

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Introduction

Almost half of all graduating students in the United States (an estimated 45 percent) take the ACT. If you're among this lucky bunch, you may be looking toward the future with a combination of anticipation and dread. You're anticipating college, with its new experiences and first tastes of freedom, but you're dreading the hoops you have to jump through to get there. Of course, the ACT is one of these hoops. If you do well on this test, you're propelled to your first-choice college; if you do poorly, maybe not.

You're not alone. And I'm here to help. As the author of *Basic Math and Pre-Algebra For Dummies* (Wiley) and *SAT Math For Dummies* (Wiley), I've already helped thousands of would-be college students get through the arduous testing process and move into the exciting life that awaits them in college.

If you're willing to keep the faith and do the work in front of you, I'm confident that you can be among those who succeed on the ACT and take one step forward into your dreams. Let this book be your guide.

About This Book

Although you certainly want to do well on all four sections of the ACT (as well as the optional writing test), this book focuses exclusively on math. The reason I'm playing favorites is simple: For many students (and possibly you, too), math is the toughest section of the test. Because your composite score on the ACT is based in part on your math score, you don't want math to drag down an otherwise good score.

The math you need to know to do well on the ACT is basically what's covered in high school: pre-algebra, elementary algebra, intermediate algebra, coordinate geometry, plane geometry, and trigonometry. If you're thinking of college, the good news is that you've probably studied a lot of this material already. The bad news is that you may have forgotten it or never felt entirely comfortable with it in the first place.

This situation is perfectly normal, and most students who aren't math geniuses feel roughly the same as you. So your task is to find a realistic strategy to pull together the stuff you already know — even if you're not currently confident that you know it — and tie in the more advanced topics that may have eluded you. Luckily, you've come to the right place.

Everything in this book is designed to take the small amount of math you may remember and build on it so you can use it to tackle typical questions that appear on the ACT. If you've laid the groundwork in school and you're willing to practice, I'll get you through the test.

My approach in this book is simple: practice, practice, and more practice. The focus is specifically on the types of questions that appear over and over again on the ACT. Even if math isn't your strong suit, when you become comfortable with this core material, you stand a much better chance of getting the kind of ACT score you want to see. And the best part is that you don't necessarily have to read this book from cover to cover. You can hop and skip around to whatever topics you need to work on most.

Conventions Used in This Book

Here are a few conventions to keep in mind as you make your way through this book:

- ✓ Variables (such as x and y) and newly defined terms are in *italics*.
- ✓ Keywords in bulleted lists, action parts of numbered steps, and answers in the practice tests are in **bold**.
- ✓ Web sites are in monofont.
- ✓ I alternate the range of the answer choices throughout the book. In one question, you see Choices (A), (B), (C), (D), and (E), and then in the one after it you see Choices (F), (G), (H), (J), (K). Because the ACT itself uses this pattern, I want you to become familiar with it before test day. And, yes, test-designers skip the letter *I*. Why? Probably to avoid confusion because it looks like the number 1.

Foolish Assumptions

I'm going out on a limb here, but if you've bought this book, my first assumption is that you or somebody you know is thinking about taking the ACT. If not, you can certainly use it to improve your knowledge of high school math. And beyond that, it also makes a useful doorstop or something to stick under the leg of a *very* wobbly table.

My second assumption is that you've taken a year of algebra, whether in high school, junior college, or some other place. You don't actually have to feel like you *know* algebra. In fact, the point of this book is to build these very skills. But if you've at least sat through an algebra class, you probably know a lot more than you think you know. Really!

How This Book Is Organized

ACT Math For Dummies is divided into six parts, each of which focuses on a different math topic you may encounter on the ACT. In this section, I give you a basic overview of these parts so you have a better idea of where you'd like to begin.

Part I: Getting into the Act: An Overview of ACT Math Basics

Chapter 1 provides an introduction to ACT math, giving you the most basic information about the test. It also includes a road map of the rest of the book. In Chapter 2, I discuss test-taking skills that aren't strictly math-related but are still necessary to do well on the ACT. In particular, I focus on some ways to work with multiple-choice questions, including plugging in answers. I also show you how to use your calculator to your advantage, rule out answers and guess wisely, and know when to jump over questions that look long or difficult.

In Chapter 3, I discuss a variety of problem-solving strategies. These include looking for a pattern by drawing a chart or picture, memorizing basic math ideas, working with math formulas, setting up word problems, and making a plan to answer difficult questions.

Part II: Building Your Pre-Algebra and Elementary Algebra Skills

In Part II, I begin helping you build your math skills. In Chapter 4, for example, you review the basics of pre-algebra: number sequences; inequalities; absolute value; factors and multiples; percents, ratios, and proportions; powers and square roots; tables and graphs; basic statistics; and probability.

In Chapter 5, you focus on elementary algebra (Algebra I), including the following: understanding basic algebra concepts and vocabulary; evaluating, simplifying, and factoring expressions; solving a variety of equations, including rational equations and equations with absolute values, square roots, and exponents; and working with equations that have more than one variable.

Chapter 6 provides 30 practice questions, covering the material from Chapters 4 and 5. Each question includes a detailed explanation of how to answer that question.

Part III: Digging In to Intermediate Algebra and Coordinate Geometry

Part III adds on to the math skills you gain in Part II. Chapter 7 discusses intermediate algebra (Algebra II). You study these topics: inequalities, systems of equations, direct and inverse proportionality, quadratic equations, and functions.

Chapter 8 covers coordinate geometry, which usually is introduced in Algebra I and is continued in Algebra II. I discuss the following topics: graphing points and lines, the distance and midpoint formulas, the slope-intercept form of a line, parallel and perpendicular lines, quadratic functions, transformations, higher-order polynomial functions, and circles on the xy -graph.

Chapter 9 offers 30 practice questions focusing on the topics covered in Chapters 7 and 8, along with answers and step-by-step explanations for each.

Part IV: Visualizing Plane Geometry and Trigonometry

Part IV completes the math skills you need to know to get a good score on the ACT. Chapter 10 focuses on plane geometry: lines and angles; triangles, including the area formula and the Pythagorean theorem; quadrilaterals such as squares, rectangles, parallelograms, and trapezoids; circles, including the formulas for area and circumference, tangents, arc length, and chords; and solid geometry.

In Chapter 11, I cover a variety of advanced math topics: trigonometry, including trig ratios, radian measure, the graphing of trig functions, and basic identities; matrices, including matrix operations and determinants; logarithms; and imaginary and complex numbers.

Chapter 12 tests your understanding of the math you discover in Chapters 10 and 11 with 30 practice questions and fully worked-out explanations.

Part V: Tracking Your Progress with Practice Tests

Part V includes three full-length ACT mathematics tests. Chapters 13, 15, and 17 each contain a different test. Each has 60 questions that should be completed in 60 minutes. In Chapters 14, 16, and 18, you find the answer keys and detailed explanations of how to answer each question.

Part VI: The Part of Tens

In Part VI, I present two top-ten lists that provide useful information about the ACT. In Chapter 19, I outline ten key differences between the ACT and the SAT. And in Chapter 20, I give you a checklist of small but vital things to remember leading up to your test day.

Icons Used in This Book

Throughout this book, I use the following four icons to help you keep track of the different kinds of information. Here's what each icon means:



This icon highlights essential information that you need to know, such as key ideas or formulas. Spending a few extra minutes studying these important points is time well spent. You also can use these icons to skim through a chapter you've already studied. Doing so helps solidify your understanding.



Each tip provides an insightful way to approach a question. You may find it especially helpful as a quick way to cut through a seemingly complicated problem.



This icon is like a flashing red light, drawing your attention to a sticky or subtle point that may trip you up if you're not aware of it. Take an extra moment to slow down and make sure you understand the point being made so it doesn't trip you up on the test.



When you see this icon, you know you're ready to put pencil to paper. This book includes dozens of examples of ACT questions, showing you how to answer them from start to finish. Use these examples to better understand a specific type of problem and then refer to them when answering the practice questions.

Where to Go from Here

I've written this book as a complete reference to ACT math. You can start anywhere you like, dip in, clarify your understanding, and then hop back out with ease.

If you're completely unfamiliar with the ACT, I recommend that you begin with Chapter 1 before branching out. In that chapter, I outline the basics of the math portion of the ACT and provide an overview of the topics that are covered on the test.

If you're ready to get studying, flip to whatever chapter discusses the topic you need help with most. Chapters 4 through 12 provide a thorough review of the specific math skills that the ACT covers. You can focus on these chapters until you feel ready to take one of the practice tests in Part V.

Alternatively, you can take a practice test first to find out which types of questions you can answer easily and which hang you up.

Part I

Getting into the Act: An Overview of ACT Math Basics