Welcome to

ACT Math Prep 2022

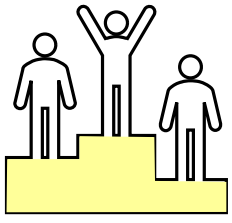


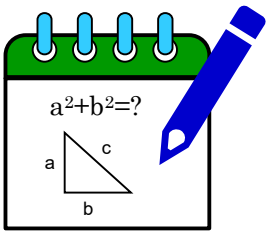


Thank you for choosing Effortless Math for your ACT Math test preparation and congratulations on making the decision to take the ACT test! It's a remarkable move you are taking, one that shouldn't be diminished in any capacity. That's why you need to use every tool possible to ensure you succeed on the test with the highest possible score, and this extensive study guide is one such tool.

If math has never been a strong subject for you, **don't worry**! This book will help you prepare for (and even ACE) the ACT test's math section. As test day draws nearer, effective preparation becomes increasingly more important. Thankfully, you have this comprehensive study guide to help you get ready for the test. With this guide, you can feel confident that you will be more than ready for the ACT Math test when the time comes.

First and foremost, it is important to note that this book is a study guide and not a textbook. It is best read from cover to cover. Every lesson of this "self-guided math book" was carefully developed to ensure that you are making the most effective use of your time while preparing for the test. This up-to-date guide reflects the 2022 test guidelines and will put you on the right track to hone your math skills, overcome exam anxiety, and boost your confidence, so that you can have your best to succeed on the ACT Math test.





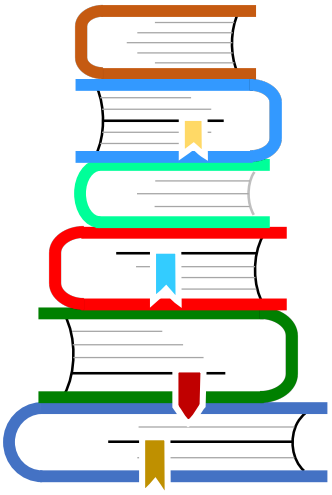
This study guide will:

- ☑ Explain the format of the ACT Math test.
- ☑ Describe specific test-taking strategies that you can use on the test.
- ☑ Provide ACT Math test-taking tips.
- ☑ Review all ACT Math concepts and topics you will be tested on.
- ☑ Help you identify the areas in which you need to concentrate your study time.
- ☑ Offer exercises that help you develop the basic math skills you will learn in each section.
- ☑ Give **2 realistic and full-length practice tests** (featuring new question types) with detailed answers to help you measure your exam readiness and build confidence.

This resource contains everything you will ever need to succeed on the ACT Math test. You'll get in-depth instructions on every math topic as well as tips and techniques on how to answer each question type. You'll also get plenty of practice questions to boost your test-taking confidence.

In addition, in the following pages you'll find:

- **How to Use This Book Effectively** – This section provides you with step-by-step instructions on how to get the most out of this comprehensive study guide.
- **How to study for the ACT Math Test** – A six-step study program has been developed to help you make the best use of this book and prepare for your ACT Math test. Here you'll find tips and strategies to guide



your study program and help you understand ACT Math and how to ace the test.

- **ACT Math Review** – Learn everything you need to know about the ACT Math test.
- **ACT Math Test-Taking Strategies** – Learn how to effectively put these recommended test-taking techniques into use for improving your ACT Math score.
- **Test Day Tips** – Review these tips to make sure you will do your best when the big day comes.

Effortless Math's ACT Online Center

Effortless Math Online ACT Center offers a complete study program, including the following:

- ✓ Step-by-step instructions on how to prepare for the ACT Math test
- ✓ Numerous ACT Math worksheets to help you measure your math skills
- ✓ Complete list of ACT Math formulas
- ✓ Video lessons for all ACT Math topics
- ✓ Full-length ACT Math practice tests
- ✓ And much more…

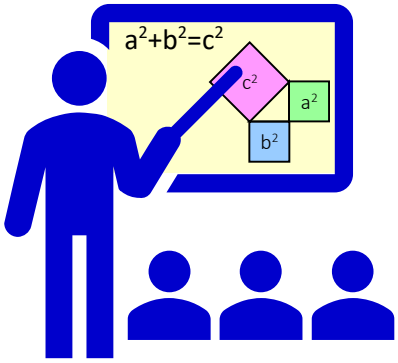
No Registration Required.

Visit **EffortlessMath.com/ACT** to find your online ACT Math resources.

How to Use This Book Effectively

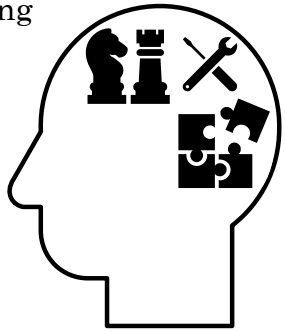
Look no further when you need a study guide to improve your math skills to succeed on the math portion of the ACT test. Each chapter of this comprehensive guide to the ACT Math will provide you with the knowledge, tools, and understanding needed for every topic covered on the test.

It's imperative that you understand each topic before moving onto another one, as that's the way to guarantee your success. Each chapter provides you with examples and a step-by-step guide of every concept to better understand the content that will be on the test. To get the best possible results from this book:



- **Begin studying long before your test date**. This provides you ample time to learn the different math concepts. The earlier you begin studying for the test, the sharper your skills will be. Do not procrastinate! Provide yourself with plenty of time to learn the concepts and feel comfortable that you understand them when your test date arrives.
- **Practice consistently**. Study ACT Math concepts at least 20 to 30 minutes a day. Remember, slow and steady wins the race, which can be applied to preparing for the ACT Math test. Instead of cramming to tackle everything at once, be patient and learn the math topics in short bursts.
- Whenever you get a math problem wrong, **mark it off, and review it later** to make sure you understand the concept.
- Start each session by **looking over the previous and related material.**
- Once you've reviewed the book's lessons, **take a practice test at the back of the book** to gauge your level of readiness. Then, review your results. Read detailed answers and solutions for each question you missed.
- **Take another practice test** to get an idea of how ready you are to take the actual exam. Taking the practice tests will give you the confidence you need on test day. Simulate the ACT testing environment by sitting in a quiet room free from distraction. Make sure to clock yourself with a timer.

Step 4: Learn and Practice Test-taking Strategies



In the following sections, you will find important test-taking strategies and tips that can help you earn extra points. You'll learn how to think strategically and when to guess if you don't know the answer to a question. Using ACT Math test-taking strategies and tips can help you raise your score and do well on the test. Apply test taking strategies on the practice tests to help you boost your confidence.

Step 5: Learn the ACT Test Format and Take Practice Tests



The *ACT Test Review* section provides information about the structure of the ACT test. Read this section to learn more about the ACT test structure, different test sections, the number of questions in each section, and the section time limits. When you have a prior understanding of the test format and different types of ACT Math questions, you'll feel more confident when you take the actual exam.

Once you have read through the instructions and lessons and feel like you are ready to go – take advantage of both of the full-length ACT Math practice tests available in this study guide. Use the practice tests to sharpen your skills and build confidence.

The ACT Math practice tests offered at the end of the book are formatted similarly to the actual ACT Math test. When you take each practice test, try to simulate actual testing conditions. To take the practice tests, sit in a quiet space, time yourself, and work through as many of the questions as time allows. The practice tests are followed by detailed answer explanations to help you find your weak areas, learn from your mistakes, and raise your ACT Math score.

Step 6: Analyze Your Performance



After taking the practice tests, look over the answer keys and explanations to learn which questions you answered correctly and which you did not. Never be discouraged if you make a few mistakes. See them as a learning opportunity. This will highlight your strengths and weaknesses.

You can use the results to determine if you need additional practice or if you are ready to take the actual ACT Math test.

Looking for more?

Visit EffortlessMath.com/ACT to find hundreds of ACT Math worksheets, video tutorials, practice tests, ACT Math formulas, and much more.

Or scan this QR code.

No Registration Required.

ACT Test Review

Since 1959, the American College Testing Organization (ACT) has been judging student's potential regarding academics. ACT is a standardized test used for college admissions in the United States. In essence, it is a broad and quick assessment of students' academic abilities.

The ACT is divided into four major segments.

- English
- Reading
- Mathematics

Science

The ACT also includes an optional 40-minute Writing Test.

In an ACT assessment test all questions are weighted the same. You also have to keep in mind that the more difficult questions are randomly thrown around in the test. You can choose to skip over the more challenging tasks and ace out the simpler questions in the tests first.

There are 60 Mathematics questions on ACT and students have 60 minutes to answer the questions. The Mathematics section of the ACT contains multiple choice questions. ACT permits the use of personal calculators on the Math portion of the test.

ACT Mathematics cover the following topics:

- Pre-Algebra (20-25%)
- Elementary Algebra (15-20%)
- Intermediate Algebra (15-20%)
- Coordinate Geometry (15-20%)
- Plane Geometry (20-25%)
- Trigonometry (5-10%)

ACT Math Test-Taking Strategies

Here are some test-taking strategies that you can use to maximize your performance and results on the ACT Math test.

#1: Use This Approach To Answer Every ACT Math Question

- Review the question to identify keywords and important information.
- Translate the keywords into math operations so you can solve the problem.
- Review the answer choices. What are the differences between answer choices?
- Draw or label a diagram if needed.
- Try to find patterns.
- Find the right method to answer the question. Use straightforward math, plug in numbers, or test the answer choices (backsolving).
- Double-check your work.

#2: Use Educated Guessing

This approach is applicable to the problems you understand to some degree but cannot solve using straightforward math. In such cases, try to filter out as many answer choices as possible before picking an answer. In cases where you don't have a clue about what a certain problem entails, don't waste any time trying to eliminate answer choices. Just choose one randomly before moving onto the next question.

As you can ascertain, direct solutions are the most optimal approach. Carefully read through the question, determine what the solution is using the math you have learned before, then coordinate the answer with one of the choices available to you. Are you stumped? Make your best guess, then move on.

Don't leave any fields empty! Even if you're unable to work out a problem, strive to answer it. Take a guess if you have to. You will not lose points by getting an answer wrong, though you may gain a point by getting it correct!

#3: BALLPARK

A ballpark answer is a rough approximation. When we become overwhelmed by calculations and figures, we end up making silly mistakes. A decimal that is moved by one unit can change an answer from right to wrong, regardless of the number of steps that you went through to get it. That's where ballparking can play a big part.

If you think you know what the correct answer may be (even if it's just a ballpark answer), you'll usually have the ability to eliminate a couple of choices. While answer choices are usually based on the average student error and/or values that are closely tied, you will still be able to weed out choices that are way far afield. Try to find answers that aren't in the proverbial ballpark when you're looking for a wrong answer on a multiple-choice question. This is an optimal approach to eliminating answers to a problem.

#4: BACKSOLVING

All questions on the ACT Math test will be in multiple-choice format. Many test-takers prefer multiple-choice questions, as at least the answer is right there. You'll typically have five answers to pick from. You simply need to figure out which one is correct. Usually, the best way to go about doing so is "backsolving."

As mentioned earlier, direct solutions are the most optimal approach to answering a question. Carefully read through a problem, calculate a solution, then correspond the answer with one of the choices displayed in front of you. If you can't calculate a solution, your next best approach involves "backsolving."

When backsolving a problem, contrast one of your answer options against the problem you are asked, then see which of them is most relevant. More often than not, answer choices are listed in ascending or descending order. In such cases, try out the choices B or C. If it's not correct, you can go either down or up from there.

CHAPTER

2 Decimals

Math topics that you'll learn in this chapter:



- ☑ Comparing Decimals
- ☑ Rounding Decimals
- ☑ Adding and Subtracting Decimals
- ☑ Multiplying and Dividing Decimals

Comparing Decimals

- A decimal is a fraction written in a special form. For example, instead of writing $\frac{1}{2}$ you can write 0.5
- A Decimal Number contains a Decimal Point. It separates the whole number part from the fractional part of a decimal number.
- Let's review decimal place values: Example: 53.9861

5: tens	3: ones	9: tenths
8: hundredths	6: thousandths	1: tens thousandths

- To compare decimals, compare each digit of two decimals in the same place value. Start from left. Compare hundreds, tens, ones, tenth, hundredth, etc.
- To compare numbers, use these symbols:

Equal to $=$,	Less than $<$,	Greater than $>$
Greater than or equal $\geq$,	Less than or equal $\leq$	

Examples:

Example 1. Compare 0.03 and 0.30.

Solution: 0.30 *is greater han* 0.03, because the tenth place of 0.30 is 3, but the tenth place of 0.03 is zero. Then: $0.03 < 0.30$

Example 2. Compare 0.0217 and 0.217.

Solution: 0.217 *is greater than* 0.0217, because the tenth place of 0.217 is 2, but the tenth place of 0.0217 is zero. Then: $0.0217 < 0.217$

Rounding Decimals

- We can round decimals to a certain accuracy or number of decimal places. This is used to make calculations easier to do and results easier to understand when exact values are not too important.
- First, you'll need to remember your place values: For example: 12.4869

1: tens	2: ones	4: tenths
8: hundredths	6: thousandths	9: tens thousandths

- To round a decimal, first find the place value you'll round to.
- Find the digit to the right of the place value you're rounding to. If it is 5 or bigger, add 1 to the place value you're rounding to and remove all digits on its right side. If the digit to the right of the place value is less than 5, keep the place value and remove all digits on the right.

Examples:

Example 1. Round 4.3679 to the thousandth place value.

Solution: First, look at the next place value to the right, (tens thousandths). It's 9 and it is greater than 5. Thus add 1 to the digit in the thousandth place. The thousandth place is 7. $\rightarrow 7 + 1 = 8$, then,
The answer is 4.368

Example 2. Round 1.5237 to the nearest hundredth.

Solution: First, look at the digit to the right of hundredth (thousandths place value). It's 3 and it is less than 5, thus remove all the digits to the right of hundredth place. Then, the answer is 1.52

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Find more at

Adding and Subtracting Decimals

- Line up the decimal numbers.
- Add zeros to have the same number of digits for both numbers if necessary.
- Remember your place values: For example: 73.5196

7: tens	3: ones	5: tenths
1: hundredths	9: thousandths	6: tens thousandths

- Add or subtract using column addition or subtraction.

Examples:

Example 1. Add. $1.7 + 4.12$

Solution: First, line up the numbers: $\begin{array}{r} 1.7 \\ +\ 4.12 \\ \hline \end{array}$ → Add a zero to have the same number of digits for both numbers. $\begin{array}{r} 1.70 \\ +\ 4.12 \\ \hline \end{array}$ → Start with the hundredths place: $0 + 2 = 2$, $\begin{array}{r} 1.70 \\ +\ 4.12 \\ \hline 2 \end{array}$ → Continue with tenths place: $7 + 1 = 8$, $\begin{array}{r} 1.70 \\ +\ 4.12 \\ \hline .82 \end{array}$ → Add the ones place: $4 + 1 = 5$, $\begin{array}{r} 1.70 \\ +\ 4.12 \\ \hline 5.82 \end{array}$

Example 2. Find the difference. $5.58 - 4.23$

Solution: First, line up the numbers: $\begin{array}{r} 5.58 \\ -\ 4.23 \\ \hline \end{array}$ → Start with the hundredths place: $8 - 3 = 5$, $\begin{array}{r} 5.58 \\ -\ 4.23 \\ \hline 5 \end{array}$ → Continue with tenths place. $5 - 2 = 3$, $\begin{array}{r} 5.58 \\ -\ 4.23 \\ \hline .35 \end{array}$ → Subtract the ones place. $5 - 4 = 1$, $\begin{array}{r} 5.58 \\ -\ 4.23 \\ \hline 1.35 \end{array}$



Multiplying and Dividing Decimals

For multiplying decimals:

- Ignore the decimal point and set up and multiply the numbers as you do with whole numbers.
- Count the total number of decimal places in both of the factors.
- Place the decimal point in the product.

For dividing decimals:

- If the divisor is not a whole number, move the decimal point to the right to make it a whole number. Do the same for the dividend.
- Divide similar to whole numbers.

Examples:

Example 1. Find the product. $0.65 \times 0.24 =$

Solution: Set up and multiply the numbers as you do with whole numbers. Line up the numbers: $\begin{array}{r} 65 \\ \times\ 24 \end{array}$ → Start with the ones place then continue with other digits → $\begin{array}{r} 65 \\ \times 24 \\ \hline 1{,}560 \end{array}$. Count the total number of decimal places in both of the factors. There are four decimals digits. (two for each factor 0.65 and 0.24) Then: $0.65 \times 0.24 = 0.1560$

Example 2. Find the quotient. $1.20 \div 0.4 =$

Solution: The divisor is not a whole number. Multiply it by 10 to get 4: → $0.4 \times 10 = 4$
Do the same for the dividend to get 12. → $1.20 \times 10 = 12$
Now, divide $12 \div 4 = 3$. The answer is 3.



Chapter 2: Practices

Compare. Use >, =, and <

1) 0.5 ☐ 0.6
2) 0.9 ☐ 0.8
3) 0.1 ☐ 0.2
4) 0.02 ☐ 0.06
5) 0.05 ☐ 0.08
6) 0.12 ☐ 0.09
7) 3.2 ☐ 2.5
8) 4.8 ☐ 8.4
9) 0.005 ☐ 0.05
10) 2.02 ☐ 20.020
11) 55.100 ☐ 55.10
12) 0.44 ☐ 0.440
13) 6.01 ☐ 6.0100
14) 0.77 ☐ 77.0

Round each decimal to the nearest whole number.

15) 5.8
16) 6.4
17) 12.3
18) 9.2
19) 7.6
20) 22.4
21) 6.8
22) 15.9
23) 13.41
24) 16.78
25) 67.58
26) 42.67
27) 55.89
28) 14.32
29) 78.88
30) 98.29