

ACT Prep: Mathematics

Objectives

- Students will become familiar with the content and test-taking tips for the ACT Mathematics test.
- Students will become familiar with the directions for the ACT Mathematics test.
- Students will have an opportunity to practice taking the ACT Mathematics test.

Information About the Mathematics Section

The mathematics section is designed to assess the mathematical skills students have typically acquired in courses taken up to the beginning of grade 12.

Most questions are self-contained. Some questions may belong to a set of several questions (e.g., each about the same graph or chart).

The material covered emphasizes the major content areas that are prerequisites to successful performance in entry-level courses in college mathematics. Knowledge of basic formulas and computational skills are assumed as background for the problems, but recall of complex formulas and extensive computation are not required.

Note: You may use a permitted calculator on the mathematics section. See www.act.org/calculator-policy.html for details about prohibited models and features.

Nine scores are reported for the mathematics section: a score for the section overall and eight reporting category scores based on specific mathematical knowledge and skills. The approximate percentage of the section devoted to each reporting category is:

Preparing for Higher Math (57-60%)

This category covers the more recent mathematics that students are learning, starting when they began using algebra as a general way of expressing and solving equations. This category is divided into five subcategories:

- **Number and Quantity (7-10%):** Demonstrate knowledge of real and complex number systems. Reason with numerical quantities in many forms, including expressions with integer and rational exponents and vectors and matrices.
- **Algebra (12-15%):** Solve, graph, and model multiple types of expressions. Interpret and use many different kinds of equations, such as linear, polynomial, radical, and exponential relationships. Find solutions to systems of equations, even when represented by a simple matrix equation, and apply results to real-world contexts.
- **Functions (12-15%):** Demonstrate knowledge of function: definition, notation, representation, and application. Use functions including linear, radical, piecewise, polynomial, exponential, and logarithmic. Manipulate and translate functions, as well as interpret and use important features of graphs.
- **Geometry (12-15%):** Apply your knowledge of shapes and solids, using concepts such as congruence and similarity relationships or surface area and volume measurements. Apply your understanding to composite objects and solve for missing values in triangles, circles, and other figures. Use trigonometric ratios and equations of conic sections.
- **Statistics & Probability (8-12%):** Describe center and spread of distributions. Apply and analyze data collection methods. Understand and model relationships in bivariate data. Calculate probabilities by recognizing the related sample spaces.

Integrating Essential Skills (40-43%)

This category focuses on measuring how well you can synthesize and apply your understandings and skills to solve more complex problems. The questions ask you to address concepts such as:

- rates and percentages
- proportional relationships
- area, surface area, and volume
- average and median
- expressing numbers in different ways

You will solve non-routine problems that involve combining skills in chains of steps, applying skills in varied contexts, understanding connections, and demonstrating fluency.

Modeling

This category represents all questions that involve producing, interpreting, understanding, evaluating, and improving models. Each question is also counted in other appropriate reporting mathematics categories. This category is an overall measure of how well you use modeling skills across mathematical topics.

Tips for Taking the Mathematics Section

- If you use a calculator, use it wisely.
 - All of the mathematics problems can be solved without a calculator. Many of the problems are best done without a calculator. Use good judgment in deciding when, and when not, to use a calculator. For example, for some problems you may wish to do scratch work to clarify your thoughts on the question before you begin using a calculator to do computations.
- Solve the problem.
 - To work out solutions to the problems, you will usually do scratch work. You may wish to glance over the answer choices after reading the questions. However, working backwards from all five answer choices can take a lot of time and may not be effective.
- Find your solution among the answer choices.
 - Once you have solved the problem, look for your answer among the choices. If your answer is not included among the choices, carefully reread the problem to see whether you missed important information. Pay careful attention to the question being asked. If an equation is to be selected, check to see whether the equation you think is best can be transformed into one of the answer choices provided.
- Make sure you answer the question.
 - The solutions to many questions will involve several steps. Make sure your answer accounts for all the necessary steps. Frequently, an answer choice is an intermediate result, not the final answer.
- Make sure your answer is reasonable.
 - Sometimes an error in computation will result in an answer that is not practically possible for the situation described. Always think about your answer to determine whether it is reasonable.
- Check your answer.
 - You may arrive at an incorrect solution by making common errors in the problem-solving process. If there is time remaining before the end of the mathematics section, it is important that you reread the questions and check your answers to make sure they are correct.