



# Chapter 1: The ACT Math Test

The ACT mathematics test is a 45-question, 50-minute test designed to assess the mathematical reasoning skills that you've acquired in courses taken up to the beginning of grade 12. All questions are self-contained.

The questions cover a wide variety of concepts, techniques, and procedures that emphasize the major content areas requisite to successful performance in entry-level courses in college mathematics. Some questions require computation, but the questions are designed to emphasize your ability to reason mathematically, not your ability to compute numbers or recall complex formulas.

You may use a calculator. See [www.act.org/calculator-policy.html](http://www.act.org/calculator-policy.html) for details about models and features that are permitted or prohibited.

## Reporting Categories: Score Reporting

Nine scores are reported for the mathematics test: a total test score based on all 41 scored questions and eight reporting category scores based on specific mathematical knowledge and skills. There are 4 items that are not scored. The approximate number of scored questions and percentage of the test devoted to each reporting category is shown in Table 1.1.

**Table 1.1: Number of Questions per Reporting Category**

Reporting Category/Reported Score	Number of Questions	Percentage of Test
Integrating Essential Skills	8	20
Preparing for Higher Mathematics	33	80
Number and Quantity	4–5	10–12
Algebra	7–8	17–20
Functions	7–8	17–20
Geometry	7–8	17–20
Statistics and Probability	5–6	12–15
Modeling	≥ 8	≥ 20
<b>Total Math Test Score</b>	<b>41</b>	<b>100</b>

## Reporting Categories: Topic Overview

**Integrating Essential Skills** measures how well you can synthesize and apply your understanding and skills from previously learned concepts to solve more complex problems. These questions ask you to address topics such as rates and percentages; proportional relationships; area, surface area, and volume; average and median; and the expression of numbers in different ways. You will be asked to solve nonroutine problems that involve combining skills in longer chains of steps in more varied contexts, while understanding conceptual connections and demonstrating fluency of skills.

**Preparing for Higher Mathematics** covers mathematics that you recently learned, starting with the use of algebra as a general way of expressing and solving equations. This category has its own reported score and is divided into five discrete categories, each with its own reported score:

- **Number and Quantity** asks about real and complex number systems. You will be asked to apply your understanding and fluency with rational numbers and the four basic operations (addition, subtraction, multiplication, and division) to irrational numbers by manipulating rational numbers and delving deeper into properties

of the real number system. You will be asked to apply your knowledge of integer exponents to rational exponents. Questions also involve vectors and matrices, which can be treated as number systems with properties, operations, and applications.

- **Algebra** asks you to solve, graph, and model different types of expressions. You will be asked to interpret and use various equations based on linear, polynomial, radical, and exponential relationships in the context of equations and inequalities. Questions will ask you to apply your understanding of expressions to strategically solve problems, and you will be asked to apply polynomial relationships in applications to create expressions, equations, and inequalities that represent problems and constraints in real-world contexts.
- **Functions** questions are based on the definition, notation, representation, and application of functions in linear, radical, piecewise, polynomial, and logarithmic forms. These questions provide a framework for modeling real-world phenomena, and you will be asked to interpret the characteristics of a function in the context of a problem while recognizing the difference between a model and reality. You will also be asked to manipulate and translate functions as well as interpret and use key features of graphs.
- **Geometry** asks you to apply your knowledge of shapes and solids to spatial concepts that include congruence and similarity relationships and surface area and volume measurements. You will be asked to apply your understanding of geometric objects to model and solve problems as well as find missing values in triangles, circles, and other figures. You will also be asked to apply trigonometric ratios as functions of right triangles and apply these concepts to the coordinate plane. Questions may also ask about trigonometric concepts of non-right triangles based on the law of sines and the law of cosines.
- **Statistics and Probability** is based on the distribution of data. You will be asked about data collection methods and relationship models in bivariate data. You will also be asked to calculate probabilities by recognizing the related sample spaces.

**Modeling** represents all questions that involve producing, interpreting, understanding, evaluating, and improving models, which are representations of complex mathematical concepts. This category is an overall measure of how well you use modeling skills across mathematical topics. Each Modeling question is also counted in other appropriate reporting categories; thus, the Modeling category is an overall measure of how well you use modeling skills across mathematical topics.

### **Tips for Taking the Mathematics Test**

#### **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 in the space provided. 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 on the test 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 test, it is important that you reread the questions and check your answers to make sure they are correct.