**Math Section Overview**

The Math Test focuses on the areas of math that play the biggest role in a wide range of college majors and careers:

- Heart of Algebra, which focuses on the mastery of linear equations and systems.
- Problem Solving and Data Analysis, which is about analyzing problems and drawing information from data.
- Passport to Advanced Math, which features questions that ask you to manipulate complex equations.
- The Math Test also includes 2 questions from Additional Topics in Math, including the geometry and trigonometry most relevant to college and career readiness.

The Math Test is divided into two parts: a no-calculator portion and a calculator portion. In both portions, most of the test is multiple choice, but some of the questions at the end ask you to write the answer (these are called "grid-ins").

**Breakdown of the Test**

| No-Calculator Portion | |
| --- | --- |
| Time allotted | 25 minutes |
| Total questions | 17 |
| Multiple-choice questions | 13 |
| Grid-in questions | 4 |
| Calculator Portion | |
| Time allotted | 45 minutes |
| Total questions | 31 |
| Multiple-choice questions | 27 |
| Grid-in questions | 4 |

**Types of Math Tested**

| Type of Math | Number of Questions |
|---|---|
| Heart of Algebra | 16 |
| Problem Solving and Data Analysis | 16 |
| Passport to Advanced Math | 14 |
| Additional Topics in Math | 2 |

**Heart of Algebra**

Heart of Algebra focuses on linear equations, systems of linear equations, and functions. These questions ask you to create equations that represent a situation, solve equations and systems of equations, and make connections between different representations of linear relationships.

Heart of Algebra includes the following types of questions:

- Create, solve, or interpret a linear expression or equation in 1 variable.

- Create, solve, or interpret linear inequalities in 1 variable.

- Build a linear function that models a linear relationship between 2 quantities.

- Create, solve, and interpret systems of linear inequalities in 2 variables.

- Create, solve, and interpret systems of 2 linear equations in 2 variables.

- Algebraically solve linear equations (or inequalities) in 1 variable.

- Algebraically solve systems of 2 linear equations in 2 variables.

- Interpret the variables and constants in expressions for linear functions.

- Understand connections between algebraic and graphical representations.

**Problem Solving and Data Analysis**

Problem Solving and Data Analysis includes using ratios, percentages, and proportional reasoning to solve problems in real-world situations, including science, social science, and other contexts. It also includes describing relationships shown graphically and analyzing statistical data.

This group of skills is really about being quantitatively literate and demonstrating a command of the math that resonates throughout college courses, career training programs, and everyday life.

Problem Solving and Data Analysis includes the following types of questions:

- Use ratios, rates, proportional relationships, and scale drawings to solve single- and multistep problems.

- Solve single- and multistep problems involving percentages.

- Solve single- and multistep problems involving measurement quantities, units, and unit conversion.

- Use scatterplot, linear, quadratic, or exponential models to describe how the variables are related.

- Use the relationship between 2 variables to investigate key features of the graph.

- Compare linear growth with exponential growth.

- Use 2-way tables to summarize categorical data and relative frequencies and calculate conditional probability.

- Make inferences about population parameters based on sample data.

- Use statistics to investigate measures of center of data. Analyze shape, center, and spread.

- Evaluate reports to make inferences, justify conclusions, and determine appropriateness of data collection methods. The reports may consist of tables, graphs, or text summaries.

**Passport to Advanced Math**

Passport to Advanced Math is the third area of focus in the PSAT/NMSQT Math Test. This area focuses on math you need to pursue further study in a discipline such as science or economics and for career opportunities in the STEM fields of science, technology, engineering, and math.

The Passport to Advanced Math area requires familiarity with more complex equations or functions, which will prepare you for calculus and advanced courses in statistics.

Passport to Advanced Math includes the following types of questions:

- Create a quadratic or exponential function or equation that models a context.

- Determine the most suitable form of an expression or equation to reveal a particular trait, given a context.

- Create equivalent expressions involving rational exponents and radicals, which includes simplifying or rewriting in other forms.

- Create an equivalent form of an algebraic expression by using structure and fluency with operations.

- Solve a quadratic equation having rational coefficients. The equation can be presented in a wide range of forms to reward attending to algebraic structure and can require manipulation to solve.

- Add, subtract, and multiply polynomial expressions. Simplify the result. The expressions will have rational coefficients.

- Solve an equation in 1 variable that contains radicals or contains the variable in the denominator of a fraction.

- Solve a system of 1 linear equation and 1 quadratic equation.

- Rewrite simple rational expressions.

- Interpret parts of nonlinear expressions in terms of their context.

- Understand the relationship between zeros and factors of polynomials. Use that knowledge to sketch graphs.

- Understand a nonlinear relationship between 2 variables by making connections between their algebraic and graphical representations.

- Use function notation, and interpret statements using function notation.

- Use structure to isolate or identify a quantity of interest in an expression or isolate a quantity of interest in an equation.

**Additional Topics in Math**

The PSAT/NMSQT Math Test also contains two questions in Additional Topics in Math (one in the no-calculator portion and one in the calculator portion). The questions might include topics like geometry, trigonometry, radian measure, and complex numbers.

Questions of this type may include the following:

- Solve problems using volume formulas.

- Use trigonometric ratios and the Pythagorean theorem to solve applied problems involving right triangles.

- Add, subtract, multiply, divide, and simplify complex numbers.

- Convert between degrees. Use radians to determine arc lengths. Use trigonometric functions of radian measure.

- Apply theorems about circles to find arc lengths, angle measures, chord lengths, and areas of sectors.

- Use concepts and theorems about congruence and similarity to solve problems about lines, angles, and triangles.

- Use the relationship between similarity, right triangles, and trigonometric ratios. Use the relationship between sine and cosine of complementary angles.

- Create or use an equation in 2 variables to solve a problem about a circle in the coordinate plane.