

# Test Blueprint **Grade 7 Mathematics** 2016 Mathematics Standards of Learning

**This test blueprint will be effective with the administration of the spring 2023 Mathematics Standards of Learning (SOL) tests.**

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**Grade 7 Mathematics**

**Standards of Learning**

**Test Blueprint**

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## General Test Information

### Test Blueprint

Much like the blueprint for a building, a test blueprint serves as a guide for test construction. The blueprint indicates the content areas that will be addressed by the test and the number of items that will be included by content area and for the test as a whole. There is a blueprint for each test (e.g., grade 3 reading, grade 5 mathematics, grade 8 science, Virginia and United States History).

The Grade 7 Mathematics blueprint contains information for two types of tests, the online computer adaptive test (CAT) and the traditional test. A CAT is an online assessment that is customized for every student based on how the student responds to the questions. This is in contrast to the traditional test in which all students who take a particular version (paper, large print, or braille) of the test respond to the same test questions. All online versions of the Grade 7 Mathematics Standards of Learning (SOL) test (including audio) are computer adaptive.

All students are required to take the online version of the SOL tests with the exception of students who meet the criteria for needing a paper test. All paper versions of the test (including large print and braille) will be administered using the traditional format. All test questions for Grade 7 Mathematics have been determined to meet the criteria for Universal Design. The Universal Design principles require that language that is not specific to the content area (e.g., mathematics) be simplified and test questions be written so they are accessible by all populations of students. The SOL test questions have been reviewed by Virginia teachers and have been determined to meet the criteria for Universal Design.

### Reporting Categories

Each test covers a number of Standards of Learning. In the test blueprint, the SOL are grouped into categories that address related content and skills. These categories are labeled as reporting categories*.* For example, a reporting category for the Grade 7 Mathematics Standards of Learning test is *Measurement and Geometry*. Each of the SOL in this reporting category requires the student to measure, describe, or compare geometric figures. When the results of the SOL tests are reported, the scores will be presented for each reporting category and as a total test score.

### Assignment of Standards of Learning to Reporting Category

In the Grade 7 Mathematics SOL test, each SOL is assigned to only one reporting category. For example, SOL 7.1a-e is assigned to “Number, Number Sense, Computation and Estimation.”

### Coverage of Standards of Learning

Due to the large number of SOL in each grade level content area, every Standard of Learning will not be assessed on every SOL test. By necessity, to keep the length of a test reasonable, each test will sample from the SOL within a reporting category. All SOL are eligible for inclusion on the traditional forms as well as the CAT forms.

### Use of the Curriculum Framework

The Grade 7 Mathematics Standards of Learning, amplified by the Curriculum Framework, define the essential understandings, knowledge, and skills that are measured by the Standards of Learning tests. The Curriculum Framework asks essential questions, identifies essential understandings, defines essential content knowledge, and describes essential skills students need to master.

### Use of Calculators

Grade 7 SOL calculator-active items will have the online calculator included with the item on the toolbar. For additional information, please refer to the list of Online Mathematics Tools available on the Grades 3-8 Mathematics Growth Assessments.

### Additional Items

Beginning in spring 2023, the computer adaptive Standards of Learning tests will include a section of additional items at the end of the test. The computer algorithm may deliver items one grade level above or one grade level below a student's current grade based upon the student's responses to the on-grade-level items. The Test Scaled Score (0 to 600) and corresponding performance level (i.e., pass/proficient, pass/advanced, fail/basic, fail/below basic) are based upon a student’s performance on the on-grade-level Operational Items only. The student’s responses to the on-grade-level Operational Items *and* the Additional Items that may be on grade level, one grade level above, or one grade level below the current grade level will be reflected in the student’s Vertical Scaled Score.

## Grade 7 Mathematics Test Blueprint Summary Table

Beginning in spring 2023, the computer adaptive Standards of Learning tests will include a section of additional items at the end of the test. The computer algorithm may deliver items one grade level above or one grade level below a student's current grade based upon the student's responses to the on-grade-level items. The Test Scaled Score (0 to 600) and corresponding performance level (i.e., pass/proficient, pass/advanced, fail/basic, fail/below basic) are based upon a student’s performance on the on-grade-level Operational Items only. The student’s responses to the on-grade-level Operational Items *and* the Additional Items that may be on grade level, one grade level above, or one grade level below the current grade level will be reflected in the student’s Vertical Scaled Score.

|  |  |  |  |
| --- | --- | --- | --- |
| **Reporting Category** | **Grade 7 SOL** | **Number of Items**  **Computer Adaptive Test (CAT) Format** | **Number of Items**  **Paper Format** |
| **Number, Number Sense, Computation, and Estimation** | **7.1a, b\*, c\*, d\*, e**  **7.2**  **7.3** | **12** | **14** |
| **Measurement and Geometry** | **7.4a-b**  **7.5**  **7.6a-b**  **7.7** | **10** | **12** |
| **Probability, Statistics, Patterns, Functions, and Algebra** | **7.8a-b**  **7.9a-c**  **7.10a-e**  **7.11**  **7.12**  **7.13** | **20** | **24** |
| **Number of Operational Items** | | **42** | **50** |  |
| **Number of Field-Test Items\*\*** | | **5** | **0** |  |
| **Number of Additional On- or Off-Grade-Level Items\*\*\*** | | **6** | **0** |  |

\*Items measuring these SOL will be completed without the use of a calculator. Calculator-active items will have the online calculator included with the item. For additional information, please refer to the list of Online Mathematics Tools available on the Grades 3-8 Mathematics Growth Assessments.

\*\*Field-test items will be administered to students for potential use on subsequent tests and will not be used to compute the final test score.

\*\*\* Legislation passed in the 2021 Virginia General Assembly ([HB2027](https://lis.virginia.gov/cgi-bin/legp604.exe?ses=212&typ=bil&val=HB2027) and [SB1357](https://lis.virginia.gov/cgi-bin/legp604.exe?ses=212&typ=bil&val=SB1357)) requires these assessments have the ability to contain additional test items at, below, and above a student’s grade level as appropriate for the student. All test items will be delivered online via the computer adaptive algorithm. Students who meet the criteria for a paper test will receive only on-grade-level items.

## Grade 7 Mathematics Expanded Test Blueprint

### Reporting Category: Number, Number Sense, Computation, and Estimation

**Number of Items: 12 (CAT) 14 (Traditional)**

**Standards of Learning:**

7.1 The student will

* 1. investigate and describe the concept of negative exponents for powers of ten;
  2. compare and order numbers greater than zero written in scientific notation;
  3. compare and order rational numbers;
  4. determine square roots of perfect squares; and
  5. identify and describe absolute value of rational numbers.

7.2 The student will solve practical problems involving operations with rational numbers.

7.3 The student will solve single-step and multistep practical problems, using proportional reasoning.

### Reporting Category: Measurement and Geometry

**Number of Items:10 (CAT) 12 (Traditional)**

**Standards of Learning:**

7.4 The student will

a) describe and determine the volume and surface area of rectangular prisms and cylinders; and

1. solve problems, including practical problems, involving the volume and surface area of rectangular prisms and cylinders.

7.5 The student will solve problems, including practical problems, involving the relationship between corresponding sides and corresponding angles of similar quadrilaterals and triangles.

7.6 The student will

1. compare and contrast quadrilaterals based on their properties; and
2. determine unknown side lengths or angle measures of quadrilaterals.

7.7 The student will apply translations and reflections of right triangles or rectangles in the coordinate plane.

### Reporting Category: Probability, Statistics, Patterns, Functions, and Algebra

**Number of Items: 20 (CAT) 24 (Traditional)**

**Standards of Learning:**

7.8 The student will

1. determine the theoretical and experimental probabilities of an event; and
2. investigate and describe the difference between the experimental probability and theoretical probability of an event.

7.9 The student, given data in a practical situation, will

a) represent data in a histogram;

b) make observations and inferences about data represented in a histogram; and

1. compare histograms with the same data represented in stem-and-leaf plots, line plots, and circle graphs.

7.10 The student will

1. determine the slope, *m*, as rate of change in a proportional relationship between two quantities and write an equation in the form *y* = *mx* to represent the relationship;
2. graph a line representing a proportional relationship between two quantities given the slope and an ordered pair, or given the equation in *y* = *mx­* form where *m* represents the slope as rate of change;
3. determine the *y*-intercept, *b*, in an additive relationship between two quantities and write an equation in the form *y* = *x* + *b* to represent the relationship;
4. graph a line representing an additive relationship between two quantities given the *y*-intercept and an ordered pair, or given the equation in the form *y* = *x* + *b*, where *b* represents the *y*-intercept; and
5. make connections between and among representations of a proportional or additive relationship between two quantities using verbal descriptions, tables, equations, and graphs.

7.11 The student will evaluate algebraic expressions for given replacement values of the variables.

7.12 The student will solve two-step linear equations in one variable, including practical problems that require the solution of a two-steplinear equation in one variable.

7.13 The student will solve one- and two-step linear inequalities in one variable, including practical problems, involving addition, subtraction, multiplication, and division, and graph the solution on a number line.