

Virginia

Standards of Learning Assessments

Blueprint

Grade 7

Mathematics Test

for the

2001 Mathematics Standards of Learning

The revised blueprint will be effective with the 2005-2006 administration of the Standards of Learning Tests.

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Grade 7 Mathematics Blueprint

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Standards of Learning (SOL) Test Blueprint

Introduction

What is a test blueprint?

A test blueprint is a guide for test construction and use. The Standards of Learning (SOL) test blueprints serve a number of purposes. They serve as a guide to test developers as they write test questions and construct the SOL tests. These blueprints also serve as a guide to educators, parents, and students in that they show:

- (a) the SOL covered by the test and which, if any, have been excluded;
- (b) which SOL are assigned to each reporting category;
- (c) the number of test items in each reporting category and on the total test;
- (d) general information about how the test questions were constructed; and
- (e) the materials that students are allowed to use while taking the test.

How is the test blueprint organized?

The blueprint contains the following information:

1. **Test Development Guidelines**: guidelines used by the testing contractor and the members of the Content Review Committees in developing the SOL tests. This section contains two parts:
 - A. General Considerations — lists general considerations that are used in developing the test as well as considerations specific to a particular content area.
 - B. Ancillary Materials — lists any materials that students are allowed to use while taking the test.
2. **Blueprint Summary Table**: a summary of the blueprint which displays the following information:
 - reporting categories for the test;
 - number of test items in each reporting category;
 - Standards of Learning (SOL) included in each reporting category. SOL are identified by numbers and letters that correspond to the original SOL document;
 - SOL which are excluded from the SOL test;
 - number of operational items on the test;
 - number of field-test items on the test; and
 - total number of items (operational and field-test items) on the test.
3. **Expanded Blueprint**: provides the same information as the Blueprint Summary Table except that the full text of each SOL is included.

What is a reporting category?

Each test assesses a number of SOL. In the test blueprint, SOL are grouped into categories that represent related content or skills. These categories are labeled *Reporting Categories*. For example, a reporting category for the Grade 5 Mathematics test is “Computation and Estimation.” Each of the SOL in this reporting category addresses computation using addition, subtraction, multiplication, or division or requires the student to estimate the answer to a problem. When the results of the SOL tests are reported, the scores will be presented in terms of scores for each reporting category and a total test score.

Are some SOL assigned to more than one reporting category?

In grade 7 mathematics, each standard, as well as each letter under a standard, is assigned to only one reporting category.

Will all SOL listed in the blueprint be assessed each time the SOL tests are given?

Each SOL will not be assessed on every SOL test form. To keep the length of a test reasonable, the test will measure a selection of the SOL within a reporting category. However, every SOL that is not excluded in the blueprint is eligible for inclusion on each form of an SOL test. Over time all SOL in a reporting category will be assessed.

Grade 7 Mathematics Test Development Guidelines

A. General Considerations

1. All items included in this test will address the knowledge and skills specified in the 2001 Virginia Standards of Learning in Mathematics for grade 7.
2. Items will be examined for any content or context that stereotypes, offends, or unfairly penalizes students based on age, gender, economic status, race, ethnicity, religion, or geographic region.
3. The test will be untimed. The test will be administered in two sections, one in which a state approved scientific calculator is permitted and one in which it is prohibited. Students will be provided with a brief break between sections.
4. There is no penalty for guessing. Students' scores will be based on the number of correct answers out of the total number of operational items on the test.
5. Students will be permitted to use a state approved scientific calculator during the second section of the test.
6. Students will be permitted to use scratch paper at any time during the test.
7. Students will be provided a formula sheet and an approximation for pi (π). A copy of the formula sheet follows the expanded blueprint.
8. Items will be grade-appropriate in terms of difficulty, interest, and reading level.
9. Where appropriate, "real-life" examples and situations that the student would likely encounter will be used to present data or ask questions.

B. Ancillary Materials

Refer to the current examiner's manual or the Department of Education's Web site for ancillary materials that may be used.

Grade 7 Mathematics Test Blueprint Summary Table

Reporting Categories	Number of Items	Grade 7 SOL
Number and Number Sense	7	7.1 7.2 7.3a,b,c,d,e
Computation and Estimation	7	7.4a,b 7.5 7.6
Measurement and Geometry	12	7.7a,b 7.8 7.9 7.10 7.11 7.12 7.13
Probability and Statistics	12	7.14 7.15 7.16 7.17a,b,c,d,e,f 7.18
Patterns, Functions, and Algebra	12	7.19 7.20 7.21 7.22a,b
SOL Excluded from This Test		None
Total Number of Operational Items	50	
Field Test Items*	10	
Total Number of Items	60	

*These field test items will *not* be used to compute students' scores on the test.

Reporting Category: Number and Number Sense
Number of Items: 7

Grade 7 SOL in This Reporting Category:

- 7.1 The student will compare, order, and determine equivalent relationships between fractions, decimals, and percents, including scientific notation for numbers greater than 10.
- 7.2 The student will simplify expressions that contain rational numbers (whole numbers, fractions, and decimals) and positive exponents, using order of operations, mental mathematics, and appropriate tools.
- 7.3 The student will identify and apply the following properties of operations with real numbers:
- the commutative and associative properties for addition and multiplication;
 - the distributive property;
 - the additive and multiplicative identity properties;
 - the additive and multiplicative inverse properties; and
 - the multiplicative property of zero.

Reporting Category: Computation and Estimation
Number of Items: 7

Grade 7 SOL in This Reporting Category:

- 7.4 The student will
- solve practical problems using rational numbers (whole numbers, fractions, decimals) and percents; and
 - solve consumer–application problems involving tips, discounts, sales tax, and simple interest.
- 7.5 The student will formulate rules for and solve practical problems involving basic operations (addition, subtraction, multiplication, and division) with integers.
- 7.6 The student will use proportions to solve practical problems, which may include scale drawings, that contain rational numbers (whole numbers, fractions, and decimals), and percents.

Reporting Category: Measurement and Geometry Number of Items: 12

Grade 7 SOL in This Reporting Category:

- 7.7 The student, given appropriate dimensions, will
- estimate and find the area of polygons by subdividing them into rectangles and right triangles; and
 - apply perimeter and area formulas in practical situations.
- 7.8 The student will investigate and solve problems involving the volume and surface area of rectangular prisms and cylinders, using concrete materials and practical situations to develop formulas.
- 7.9 The student will compare and contrast the following quadrilaterals: parallelogram, rectangle, square, rhombus, and trapezoid. Deductive reasoning and inference will be used to classify quadrilaterals.
- 7.10 The student will identify and draw the following polygons: pentagon, hexagon, heptagon, octagon, nonagon, and decagon.
- 7.11 The student will determine if geometric figures - quadrilaterals and triangles - are similar and write proportions to express the relationships between corresponding parts of similar figures.
- 7.12 The student will identify and graph ordered pairs in the four quadrants of a coordinate plane.
- 7.13 The student, given a polygon in the coordinate plane, will represent transformations – rotation and translation –by graphing the coordinates of the vertices of the transformed polygon and sketching the resulting figure.

Reporting Category: Probability and Statistics
Number of Items: 12

Grade 7 SOL in This Reporting Category:

- 7.14 The student will investigate and describe the difference between the probability of an event found through simulation versus the theoretical probability of that same event.
- 7.15 The student will identify and describe the number of possible arrangements of several objects, using a tree diagram or the Fundamental (Basic) Counting Principle.
- 7.16 The student will create and solve problems involving the measures of central tendency (mean, median, mode), and range of a set of data.
- 7.17 The student, given a problem situation, will collect, analyze, display, and interpret data, using a variety of graphical methods, including
- a) frequency distributions;
 - b) line plots;
 - c) histograms;
 - d) stem-and-leaf plots;
 - e) box-and-whisker plots; and
 - f) scattergrams.
- 7.18 The student will make inferences, conjectures, and predictions based on analysis of a set of data.

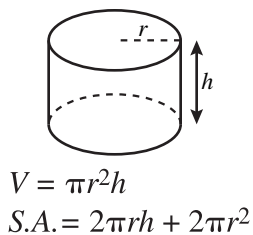
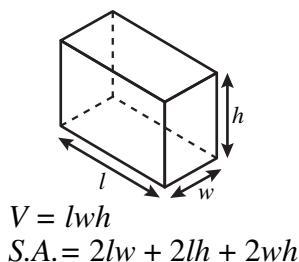
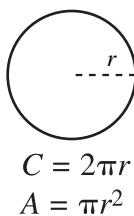
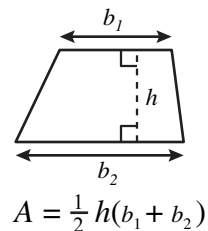
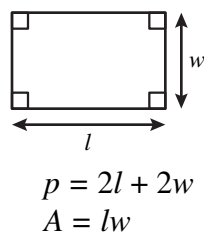
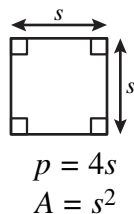
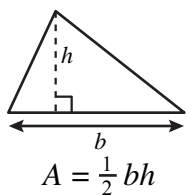
Reporting Category: Patterns, Functions, and Algebra
Number of Items: 12

Grade 7 SOL in This Reporting Category:

- 7.19 The student will represent, analyze, and generalize a variety of patterns, including arithmetic sequences and geometric sequences, with tables, graphs, rules, and words in order to investigate and describe functional relationships.
- 7.20 The student will write verbal expressions as algebraic expressions and sentences as equations.
- 7.21 The student will use the following algebraic terms appropriately: *equation*, *inequality*, and *expression*.
- 7.22 The student will
- a) solve one-step linear equations and inequalities in one variable with strategies involving inverse operations and integers, using concrete materials, pictorial representations, and paper and pencil; and
 - b) solve practical problems requiring the solution of a one-step linear equation.

Grade 7 Mathematics Formula Sheet

Geometric Formulas



Abbreviations

milligram	mg
gram	g
kilogram	kg
milliliter	mL
liter	L
kiloliter	kL
millimeter	mm
centimeter	cm
meter	m
kilometer	km
square centimeter	cm ²
cubic centimeter	cm ³

ounce	oz
pound	lb
quart	qt
gallon	gal.
inch	in.
foot	ft
yard	yd
mile	mi.
square inch	sq in.
square foot	sq ft
cubic inch	cu in.
cubic foot	cu ft

area	A
perimeter	p
circumference	C
volume	V
total surface area	$S.A.$

year	yr
month	mon
hour	hr
minute	min
second	sec

Pi

$$\pi \approx 3.14$$

$$\pi \approx \frac{22}{7}$$