

Reference Sheet

A stand-alone reference sheet will be handed out with each of the three test books. For the 2016 Grade 8 Common Core Mathematics Test, the reference sheet will look as follows:

Grade 8 Mathematics Reference Sheet

CONVERSIONS

1 inch = 2.54 centimeters	1 kilometer = 0.62 mile	1 cup = 8 fluid ounces
1 meter = 39.37 inches	1 pound = 16 ounces	1 pint = 2 cups
1 mile = 5,280 feet	1 pound = 0.454 kilogram	1 quart = 2 pints
1 mile = 1,760 yards	1 kilogram = 2.2 pounds	1 gallon = 4 quarts
1 mile = 1.609 kilometers	1 ton = 2,000 pounds	1 gallon = 3.785 liters
		1 liter = 0.264 gallon
		1 liter = 1,000 cubic centimeters

FORMULAS

Triangle	$A = \frac{1}{2}bh$
Parallelogram	$A = bh$
Circle	$A = \pi r^2$
Circle	$C = \pi d$ or $C = 2\pi r$
General Prisms	$V = Bh$
Cylinder	$V = \pi r^2 h$
Sphere	$V = \frac{4}{3}\pi r^3$
Cone	$V = \frac{1}{3}\pi r^2 h$
Pythagorean Theorem	$a^2 + b^2 = c^2$



Test Design

In Grade 8, students are required to apply mathematical understandings and mathematical practices gained in the classroom in order to answer three types of questions: multiple-choice, short-response, and extended-response. Book 1 and Book 2 will consist of multiple-choice questions. Book 3 consists of short- and extended-response questions. Students will **NOT** be permitted to use calculators for Book 1. For Book 2 and Book 3, students **must have the exclusive use of a scientific calculator**. For more information about calculator use, please refer to page 13.

The chart below provides a description of the 2016 Grade 8 Test Design. Please note that the number of multiple-choice questions in Book 1 and in Book 2 includes embedded field test questions. It will not be apparent to students whether a question is an embedded field test question that does not count towards their score or an operational test question that does count towards their score.

Grade 8 Test Design

Book	Number of Multiple-Choice Questions	Number of Short-Response Questions	Number of Extended-Response Questions	Total Number of Questions
1	26	0	0	26
2	25	0	0	25
3	0	6	4	10
Total	51	6	4	61

2016 Grade 8 Common Core Mathematics Test Blueprint

All questions on the 2016 Grade 8 Common Core Mathematics Test measure the CCLS for Mathematics. The test was designed around the Content Emphases (page 3). As such, questions that assess the Major Clusters make up the majority of the test. Additionally, standards recommended for more emphasis within clusters (page 5) are assessed with greater frequency.

While all questions are linked to a primary standard, many questions measure more than one standard and one or more of the Standards for Mathematical Practices. Similarly, some questions measure cluster-level understandings. As a result of the alignment to standards, clusters, and the Standards for Mathematical Practice, the tests assess students' conceptual understanding, procedural fluency, and problem-solving abilities, rather than assessing their knowledge of isolated skills and facts.

The tables below illustrate the domain-level and cluster-level test blueprint. For more information on which clusters and standards to emphasize in instruction, please refer to page 5.

Domain-Level Test Blueprint—Percent of Test Points on Grade 8 Test				
The Number System	Expressions and Equations	Functions	Geometry	Statistics and Probability
0%	40–45%	25–30%	20–25%	10–15%

Cluster-Emphasis Test Blueprint—Percent of Test Points on Grade 8 Test		
Major Clusters	Supporting Clusters	Additional Clusters
70–80%	10–20%	5–10%

Mathematics Rubrics and Scoring Policies

The 2016 Grade 8 Common Core Mathematics Test will use rubrics and scoring policies similar to those used in 2015. Both the 2015 Mathematics 2-point and 3-point Rubrics were changed to more clearly reflect the new demands called for by the CCLS. Similarly, scoring policies were amended to better address the CCLS Mathematics Standards. The Mathematics Rubrics are as follows:

2-Point Holistic Rubric

2 Points	<p>A two-point response includes the correct solution to the question and demonstrates a thorough understanding of the mathematical concepts and/or procedures in the task.</p> <p>This response</p> <ul style="list-style-type: none">• indicates that the student has completed the task correctly, using mathematically sound procedures• contains sufficient work to demonstrate a thorough understanding of the mathematical concepts and/or procedures• may contain inconsequential errors that do not detract from the correct solution and the demonstration of a thorough understanding
1 Point	<p>A one-point response demonstrates only a partial understanding of the mathematical concepts and/or procedures in the task.</p> <p>This response</p> <ul style="list-style-type: none">• correctly addresses only some elements of the task• may contain an incorrect solution but applies a mathematically appropriate process• may contain the correct solution but required work is incomplete
0 Points*	<p>A zero-point response is incorrect, irrelevant, incoherent, or contains a correct solution obtained using an obviously incorrect procedure. Although some elements may contain correct mathematical procedures, holistically they are not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.</p>

*Condition Code A is applied whenever a student who is present for a test session leaves an entire constructed-response question in that session completely blank (no response attempted).

2-Point Scoring Policies

- The Scoring Policies provided for the 2015 New York State Tests will apply to the 2016 Common Core Mathematics Tests.
- The Scoring Policies are provided on page 12.

3-Point Holistic Rubric

3 Points	<p>A three-point response includes the correct solution(s) to the question and demonstrates a thorough understanding of the mathematical concepts and/or procedures in the task.</p> <p>This response</p> <ul style="list-style-type: none"> • indicates that the student has completed the task correctly, using mathematically sound procedures • contains sufficient work to demonstrate a thorough understanding of the mathematical concepts and/or procedures • may contain inconsequential errors that do not detract from the correct solution(s) and the demonstration of a thorough understanding
2 Points	<p>A two-point response demonstrates a partial understanding of the mathematical concepts and/or procedures in the task.</p> <p>This response</p> <ul style="list-style-type: none"> • appropriately addresses most but not all aspects of the task using mathematically sound procedures • may contain an incorrect solution but provides sound procedures, reasoning, and/or explanations • may reflect some minor misunderstanding of the underlying mathematical concepts and/or procedures
1 Point	<p>A one-point response demonstrates only a limited understanding of the mathematical concepts and/or procedures in the task.</p> <p>This response</p> <ul style="list-style-type: none"> • may address some elements of the task correctly but reaches an inadequate solution and/or provides reasoning that is faulty or incomplete • exhibits multiple flaws related to misunderstanding of important aspects of the task, misuse of mathematical procedures, or faulty mathematical reasoning • reflects a lack of essential understanding of the underlying mathematical concepts • may contain the correct solution(s) but required work is limited
0 Points*	<p>A zero-point response is incorrect, irrelevant, incoherent, or contains a correct solution obtained using an obviously incorrect procedure. Although some elements may contain correct mathematical procedures, holistically they are not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.</p>

*Condition Code A is applied whenever a student who is present for a test session leaves an entire constructed-response question in that session completely blank (no response attempted).

3-Point Scoring Policies

- The Scoring Policies provided for the 2015 New York State Tests will apply to the 2016 Common Core Mathematics Tests.
- The Scoring Policies are provided below.

2016 2- and 3-Point Mathematics Scoring Policies

Below are the policies to be followed while scoring the mathematics tests for all grades:

1. If a student does the work in other than a designated “Show your work” area, that work should still be scored. (Additional paper is an allowable accommodation for a student with disabilities if indicated on the student’s Individual Education Program or Section 504 Accommodation Plan.)
2. If the question requires students to show their work, and the student shows appropriate work and clearly identifies a correct answer but fails to write that answer in the answer blank, the student should still receive full credit.
3. In questions that provide ruled lines for students to write an explanation of their work, mathematical work shown elsewhere on the page should be considered and scored.
4. If the student provides one legible response (and one response only), teachers should score the response, even if it has been crossed out.
5. If the student has written more than one response but has crossed some out, teachers should score only the response that has **not** been crossed out.
6. Trial-and-error responses are **not** subject to Scoring Policy #5 above, since crossing out is part of the trial-and-error process.
7. If a response shows repeated occurrences of the same conceptual error within a question, the student should **not** be penalized more than once.
8. In questions that require students to provide bar graphs,
 - in Grades 3 and 4 only, touching bars are acceptable
 - in Grades 3 and 4 only, space between bars does **not** need to be uniform
 - in all grades, widths of the bars must be consistent
 - in all grades, bars must be aligned with their labels
 - in all grades, scales must begin at 0, but the 0 does **not** need to be written
9. In questions requiring number sentences, the number sentences must be written horizontally.
10. In pictographs, the student is permitted to use a symbol other than the one in the key, provided that the symbol is used consistently in the pictograph; the student does not need to change the symbol in the key. The student may **not**, however, use multiple symbols within the chart, nor may the student change the value of the symbol in the key.
11. If students are not directed to show work, any work shown will not be scored. This applies to items that do not ask for any work and items that ask for work for one part and do not ask for work in another part.

12. Condition Code A is applied whenever a student who is present for a test session leaves an entire constructed-response question in that session completely blank (no response attempted). This is not to be confused with a score of zero wherein the student does respond to part or all of the question but that work results in a score of zero.

Mathematics Tools

Why Mathematics Tools?

These provisions are necessary for students to meet Standard for Mathematical Practice Five found throughout the New York State P–12 Common Core Learning Standards for Mathematics:

Use appropriate tools strategically

Mathematically proficient students consider the available tools when solving a mathematical problem. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a web site, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

On prior tests that measured prior grade-level standards, small symbols (calculators, protractors, and rulers) were used to alert students that they should use math tools to help solve questions. These symbols will **NOT** appear on the 2016 Grade 8 Common Core Mathematics Test. It is up to the student to decide when it will be helpful to use math tools to answer a question.

Rulers and Protractors

Students in Grade 8 must have a ruler and a protractor for their exclusive use for all sessions of the test. Students with disabilities may use adapted rulers and protractors if this is indicated as a testing accommodation on the student's Individualized Education Program or Section 504 Accommodation Plan.

Note: Schools are responsible for supplying the appropriate tools for use with the Grade 8 Mathematics Test. NYSED does not provide them.

Calculators

Students in Grade 8 are **NOT** permitted to use calculators with Book 1. For Book 2 and for Book 3, students must have the exclusive **use of a scientific calculator**. Graphing calculators are **NOT** permitted.

Value of Pi

Students should learn that π is an irrational number. For the short-response and extended-response questions in Grade 8 (Book 3), the π key and the full display of the calculator should be used in computations. The approximate values of π , such as 3.1416, 3.14, or $\frac{22}{7}$, are unacceptable.