



**The New York City
Department of Education**

**Grade 7 Mathematics Benchmark
Assessment**

**Teacher Guide
Fall 2012**

November 26, 2012–January 11, 2013



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Test Design and Instructional Purpose

The Mathematics Benchmark Assessment is designed to help you collect *some* information about your students' progress toward meeting the Common Core expectations for seventh grade. This information can provide insights into your students' mathematical proficiency, specifically their fluency with skills, their conceptual understanding, and their ability to apply concepts and skills in novel settings. Consequently, the results from the Benchmark Assessment may influence your plans for targeting instruction to meet your students' needs.

There are two Benchmark Assessments available for the school year. Both assessments are aligned to units from the New York City Department of Education's Curriculum Maps. The first Grade 7 Mathematics Benchmark Assessment, designed to be administered in the fall, focuses on Unit 1; and the second Grade 7 Mathematics Benchmark Assessment, designed to be administered in the winter, focuses on Units 2, 3 and the first half of Unit 4. The assessments contain various item types: multiple choice, short response, and constructed response/performance tasks. Items may partially align to a single standard, several standards, a cluster, or a domain, or may require synthesis across clusters and/or domains.

The Benchmark Assessments are meant to provide a lens for identifying some of the skills and concepts that may need to be taught or reinforced if students are to meet the Common Core expectations for seventh grade. The results of this assessment will best support your instruction and your students' learning if you are familiar with the Common Core Learning Standards including the fluency expectations, key advances, and culminating standards.

Limitations

Neither Benchmark Assessment is an exhaustive test. While each Benchmark Assessment reflects the Common Core Learning Standards in the units that comprise its blueprint, Common Core Standards contain a breadth of skills and concepts that cannot be fully assessed by any single measure.

Additionally, each Benchmark Assessment is limited to one, two, or three units and covers approximately 25–40% of the year's instruction. Accordingly, the Benchmark Assessments do not reflect the work of the entire grade.

As a result, this assessment is best used as part of a comprehensive set of evaluative measures that include teacher observation, classwork, homework, and school- or teacher-made assessments.

Test Content

Unit 1 focuses on Adding, Subtracting, Multiplying, and Dividing Rational Numbers.

Content of Benchmark 1

Unit	Domain	Cluster	Standard	Items
1	The Number System	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	7.NS.1a. Describe situations in which opposite quantities combine to make 0. <i>For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.</i>	1, 21
1	The Number System	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	7.NS.1b. Understand $p + q$ as the number located a distance absolute value (q) from p , in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.	2, 4, 6, 9
1	The Number System	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	7.NS.1.c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.	27, 30

1	The Number System	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	7.NS.1d. Apply properties of operations as strategies to add and subtract rational numbers.	10, 11, 12, 20, 24, 29
1	The Number System	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	7.NS.2a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.	31
1	The Number System	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	7.NS.2b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.	14
1	The Number System	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	7.NS.2c. Apply properties of operations as strategies to multiply and divide rational numbers.	3, 13, 19, 22, 25

1	The Number System	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	7.NS.2d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.	5, 16
1	The Number System	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	7.NS.3. Solve real-world and mathematical problems involving the four operations with rational numbers.	7, 8, 15, 18, 23
1	Expressions and Equations	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	7.EE.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.	17, 26, 28, 32, 33

Rubrics for Scoring Short-Response and Extended-Response/Performance Task Items

Item # 27

Key Elements	
N/A	
Criteria	
2	Meets Standard (Meets criteria at grade level) Writes the difference between the highest and lowest temperatures AND Writes the difference in the lowest temperatures
1	Near Standard (Mostly meets criteria) Writes the difference between the highest and lowest temperatures OR Writes the difference in the lowest temperatures
0	Far Below Standard Incorrect response
Exemplar	
2	37° C AND 5° C

Item # 28

Key Elements	
N/A	
Criteria	
3	Meets Standard (Meets criteria at grade level) 3 correct elements Writes the correct numerical expression AND Writes the total cost to ship the piece of furniture AND Writes a correct explanation of why Mr. Jackson is incorrect

2	<p>Near Standard (Mostly meets criteria) 2 correct elements Writes the correct numerical expression and writes the total cost to ship the piece of furniture OR Writes the correct numerical expression and writes a correct explanation of why Mr. Jackson is incorrect OR Writes the correct total cost to ship the piece of furniture and writes a correct explanation of why Mr. Jackson is incorrect</p>
1	<p>Approaching standard (Partially meets criteria) 1 correct element Writes the correct numerical expression OR Writes the total cost to ship the piece of furniture OR Writes a correct explanation of why Mr. Jackson is incorrect</p>
0	<p>Far Below Standard Incorrect response</p>
Exemplar	
3	<p>Part A $\\$4.99 + \\0.65×8 OR Other valid expression AND</p> <p>Part B $\\$10.19$ AND</p> <p>Part C Mr. Jackson is incorrect. Mr. Jackson is paying an extra $\\$0.10$ per pound. Since the item weighs 8 pounds, he pays an additional $8(\\$0.10) = \\0.80. OR Other valid explanation</p>

Item # 29

Key Elements	
N/A	
Criteria	
3	<p>Meets Standard (Meets criteria at grade level)</p> <p>3 correct elements</p> <p>Writes the expression</p> <p>AND</p> <p>Writes the value of the expression</p> <p>AND</p> <p>Shows complete and correct steps to find the value of the expression</p>
2	<p>Near Standard (Mostly meets criteria)</p> <p>2 correct elements</p> <p>Writes the expression</p> <p>AND</p> <p>Writes the value of the expression</p> <p>OR</p> <p>Writes the expression</p> <p>AND</p> <p>Shows complete and correct steps to find the value of the expression</p> <p>OR</p> <p>Writes the value of the expression</p> <p>AND</p> <p>Shows complete and correct steps to find the value of the expression</p>
1	<p>Approaching standard (Partially meets criteria)</p> <p>1 correct element</p> <p>Writes the expression</p> <p>OR</p> <p>Writes the value of the expression</p> <p>OR</p> <p>Shows complete and correct steps to find the value of the expression</p>
0	<p>Far Below Standard</p> <p>Incorrect response</p>
Exemplar	
3	<p>$(\frac{7}{8} + \frac{1}{4}) - \frac{1}{3}$</p> <p>AND</p> <p>$\frac{19}{24}$</p> <p>AND</p> <p>$(\frac{7}{8} + \frac{1}{4}) - \frac{1}{3}$</p> <p>$(\frac{21}{24} + \frac{6}{24}) - \frac{8}{24}$</p> <p>$\frac{27}{24} - \frac{8}{24} = \frac{19}{24}$</p> <p>OR</p> <p>Other valid process</p>

Item # 30

Key Elements	
N/A	
Criteria	
2	<p>Meets Standard (Meets criteria at grade level) 2 correct elements Shows the correct and complete steps to calculate the value of the expression and writes the value AND Explains how to find the answer using the number line</p>
1	<p>Approaching Standard (Partially meets criteria) 1 correct element Shows the correct and complete steps to calculate the value of the expression and writes the value OR Explains how to find the answer using the number line</p>
0	<p>Far Below Standard Incorrect response</p>
Exemplar	
2	<p>$-9 - 8 = -9 + (-8) = -17$ AND You can show -9 on the number line by making an arrow which starts from 0 and moves left by 9 units. To add -8 to -9, the arrow is moved 8 units left from -9 to -17 OR Other valid explanation Note: An acceptable answer may include a correctly labeled number line that shows the subtraction steps and also shows -17, BUT that is not necessary to earn credit.</p>

Item # 31

Key Elements	
N/A	
Criteria	
3	<p>Meets Standard (Meets criteria at grade level) 3 correct elements Writes an expression that can be used to find the height of the hillside after the storm AND Writes the answer AND Writes the complete and correct explanation for the work</p>

2	<p>Near Standard (Mostly meets criteria)</p> <p>2 correct elements</p> <p>Writes an expression that can be used to find the height of the hillside after the storm</p> <p>AND</p> <p>Writes the answer</p> <p>OR</p> <p>Writes an expression that can be used to find the height of the hillside after the storm</p> <p>AND</p> <p>Writes the complete and correct explanation for the work</p> <p>OR</p> <p>Writes the answer</p> <p>AND</p> <p>Writes the complete and correct explanation for the work</p>
1	<p>Near Standard (Mostly meets criteria)</p> <p>Writes an expression that can be used to find the height of the hillside after the storm</p> <p>OR</p> <p>Writes the answer</p> <p>OR</p> <p>Writes the complete and correct explanation for the work</p>
0	<p>Far Below Standard</p> <p>Incorrect response</p>
Exemplar	
3	<p>$9 + (-1/8 \times 8)$</p> <p>OR</p> <p>Other valid explanation</p> <p>AND</p> <p>8</p> <p>AND</p> <p>I multiplied 8 and $-1/8$ because it eroded $1/8$ inch each day for 8 days to find the amount of erosion and added the product to 9.</p> <p>OR</p> <p>Other valid explanation</p>

Item # 32

Key Elements	
N/A	
Criteria	
6	<p>Meets Standard (Meets criteria at grade level)</p> <p>6 correct elements</p> <p>Writes a valid expression or equation that can be used to find the cost of each key chain</p>

	<p>AND Finds the correct cost of a key chain AND Shows valid work for finding the correct cost of a key chain AND Writes a valid explanation of why Sharon's friend's key chain cost is incorrect AND Writes how many more key chains could have been bought AND Shows the work done to find how many more key chains could have been bought</p>
5	5 correct elements
4	4 correct elements
3	3 correct elements
2	2 correct elements
1	1 correct element
0	Far Below Standard Incorrect response
Exemplar	
6	<p>Part A $(9 - 2.25)/5$ Or other valid expression AND</p> <p>Part B $9.00 = 2.25 + 5x$ $6.75 = 5x$ $x = 1.35$ AND \$1.35 AND</p> <p>Part C Sharon's friend is incorrect. The key chains only cost \$1.35. The doll costs \$2.25. Or other valid explanation AND</p> <p>Part D 1 more key chain AND $(9 - .9)/1.35 = 6$ Or other valid method</p>

Item # 33

Key Elements	
N/A	
Criteria	
6	<p>Meets Standard (Meets criteria at grade level) 6 correct elements Writes the correct fraction equivalent AND Gives a valid explanation to show the reasonableness of the statement AND Writes a correct equation using m AND Writes a valid explanation of the process used to write the equation AND Writes the correct total amount of money to be raised AND Shows the work to solve for m in the equation</p>
5	5 correct elements
4	4 correct elements
3	3 correct elements
2	2 correct elements
1	1 correct element
0	<p>Far Below Standard Incorrect response</p>
Exemplar	
6	<p>Part A $\frac{3}{4}$ AND \$240 divided into 4 parts is \$60 per part. The students saved 3 parts and required \$50 more. Since \$50 is less than \$60, saving 1 more part would have given them more than the money required for the field trip or another valid strategy using the fraction . AND</p> <p>Part B $m = 50 + \frac{3}{4} \times 240$ OR An equivalent equation AND m represents the total amount of money they require. With 75% of \$240, they</p>

are short of the total amount by \$50. So the sum of 75% of 240 and 50 must equal m .

OR

Other valid explanation

AND

\$230

AND

$$m = 50 + \left(\frac{3}{4}\right) \times 240$$

$$m = 50 + 180$$

$$m = 230$$

OR

Other valid process



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