



**The New York City
Department of Education**

**Grade 7 Mathematics Baseline
Assessment**

Teacher Version

September 24, 2012–June 14, 2013



Test Design and Instructional Purpose

The Mathematics Baseline Assessment is designed to help you collect *some* information about your students' mathematical readiness for the work they will encounter in seventh grade. This information can provide insight around students' understanding of the skills, concepts, and application necessary to support successful engagement in the major work of seventh grade. Consequently, the results from the Baseline Assessment may assist you in developing instructional plans that will help your students meet the Common Core expectations for seventh grade.

The assessment is composed of three sections that assess skills and content from the previous grade. Each section has a particular focus. The focus of each section was determined by identifying concepts from sixth grade that support major concepts in seventh grade. All of the items are multiple-choice and were developed to assess a student's understanding of a particular part(s) of a standard, cluster, or domain.

This assessment is meant to be a resource for identifying and understanding some of the skills and concepts that may need to be reinforced/taught if students did not learn them in the previous grade. Please note that since schools are at different points in their transition to the Common Core Learning Standards, students may or may not have been exposed to the Common Core Learning Standards of the preceding 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

The Baseline Assessment is not an exhaustive test. Some important Common Core Learning Standards contain prerequisite skills and concepts that could not be assessed on this test.

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

In Grade 6, the major work focuses largely on fluency with operations with whole numbers, decimals, and fractions; on using the properties of operations to work with variable expressions and equations; and on using multiplication and division of fractions to understand ratios, proportional relationships, and unit rates. In Grade 7, students are expected to build on these understandings by becoming fluent in operations with rational numbers; solving problems involving rational numbers and measurements; analyzing proportional relationships; working with percentages (simple interest, percent increase and decrease, tax, etc.); solving problems involving unit rates associated with ratios of fractions; and analyzing proportional relationships in geometric figures. Additionally, students are expected to learn how to solve multi-step problems with positive and negative rational numbers (whole numbers, fractions and decimals); to apply properties of operations to rewrite linear expressions with rational coefficients fluently; and to solve word problems leading to one-variable equations of the form $px + q = r$ and $p(x + q) = r$, fluently.

Section 1 (11 items): This section focuses on dividing fractions by fractions; understanding integers and absolute value; and using rational numbers in the context of surface area and perimeter.

Section 2 (9 items): This section focuses on understanding ratio and rate language and applying ratio and rate reasoning to solve problems involving equivalent ratios, unit rates, percentages and conversions.

Section 3 (10 items): This section focuses on evaluating expressions; applying properties of operations to generate equivalent expressions; using variables to represent quantities; and writing expressions, equations, and inequalities when solving problems.

Math Baseline Grade 7 Report*	
<p>Section 1 Standards 6.NS.1; 6.NS.5; 6.NS.6c; 6.NS.7c; 6.NS.7d; 6.EE.2c</p>	<p>A student who correctly answers the questions in Section 1 evidences an understanding of dividing fractions by fractions including in context; understanding integers and absolute value; and using rational numbers to evaluate expressions including expressions involving perimeter and surface area. These skills will support students in Grade 7 with the expectation of fluency in adding, subtracting, multiplying and dividing within the system of rational numbers as well as with solving a variety of problems involving angle measure, area, surface area and volume.</p>
<p>Section 2 Standards 6.RP.1; 6.RP.2; 6.RP.3a; 6.RP.3b; 6.RP.3c; 6.RP.3d</p>	<p>A student who correctly answers the questions in Section 2 evidences an understanding of ratio and rate language and application of ratio and rate reasoning to solve problems involving equivalent ratios, unit rates, percents and conversions. These skills will support students in Grade 7 with analyzing proportional relationships; working with percents; solving problems involving unit rates associated with ratios of fractions; and analyzing proportional relationships in geometric figures.</p>
<p>Section 3 Standards 6.EE.2c; 6.EE.3; 6.EE.6; 6.EE.7; 6.EE.8; 6.EE.9</p>	<p>A student who correctly answers the questions in Section 3 evidences an understanding of evaluating expressions; applying properties of operations to generate equivalent expressions; using variables to represent quantities and to write expressions, equations, and inequalities when solving problems. Students will apply these skills in Grade 7 as they solve multi-step problems posed with positive and negative rational numbers in any form (whole numbers, fractions and decimals), apply properties of operations to rewrite linear expressions with rational coefficients fluently, and solve word problems leading to one-variable equations of the form $px + q = r$ and $p(x + q) = r$, fluently.</p>

*Listed standards indicate that at least one item is partially aligned to that standard.

Section 1 Items:

Grade	Domain	Cluster	Standard	Items
6	The Number System	Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	6.NS.1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ of $8/9$ is $2/3$. (In general, $(a/b) \div (c/d) = ad/bc$.) How much chocolate will each person get if 3 people share $1/2$ lb of chocolate equally? How many $3/4$ -cup servings are in $2/3$ of a cup of yogurt? How wide is a rectangular strip of land with length $3/4$ mi and area $1/2$ square mi?	3,4,5
6	The Number System	Apply and extend previous understandings of arithmetic to algebraic expressions.	6.NS.5. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.	10
6	The Number System	Apply and extend previous understandings of arithmetic to algebraic expressions.	6.NS.6c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.	1,2
6	The Number System	Apply and extend previous understandings of arithmetic to algebraic expressions.	6.NS.7c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. For example, for an account balance of -30 dollars, write $ -30 = 30$ to describe the size of the debt in dollars.	9
6	The Number System	Apply and extend previous understandings of arithmetic to algebraic expressions.	6.NS.7d. Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars.	11
6	Expressions and Equations	Apply and extend previous understandings of arithmetic to algebraic expressions.	6.EE.2c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$.	6,7,8

Section 2 Items:

Grade	Domain	Cluster	Standard	Items
6	Ratios and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	6.RP.1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”	14
6	Ratios and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	6.RP.2. Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $3/4$ cup of flour for each cup of sugar.” “We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger.”	16
6	Ratios and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	6.RP.3a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.	13
6	Ratios and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	6.RP.3b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?	17,20
6	Ratios and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	6.RP.3c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means $30/100$ times the quantity); solve problems involving finding the whole, given a part and the percent.	15,19
6	Ratios and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	6.RP.3d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.	12,18

Section 3 Items:

Grade	Domain	Cluster	Standard	Items
6	Expressions and Equations	Apply and extend previous understandings of arithmetic to algebraic expressions.	6.EE.2c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$.	23
6	Expressions and Equations	Apply and extend previous understandings of arithmetic to algebraic expressions.	6.EE.3. Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$.	21,22
6	Expressions and Equations	Apply and extend previous understandings of arithmetic to algebraic expressions.	6.EE.6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.	24
6	Expressions and Equations	Apply and extend previous understandings of arithmetic to algebraic expressions.	6.EE.7. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all non-negative rational numbers.	29,30
6	Expressions and Equations	Apply and extend previous understandings of arithmetic to algebraic expressions.	6.EE.8. Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.	25,26
6	Expressions and Equations	Apply and extend previous understandings of arithmetic to algebraic expressions.	6.EE.9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.	27,28



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