

Miami-Dade County Public Schools
Florida's B.E.S.T. Mathematics
Grade 7 - Achievement Level Descriptor Tables

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MA.7.NSO.1.1 (Context: Mathematical)			
Know and apply the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions, limited to whole-number exponents and rational number bases			
Benchmark Clarifications			
<p><i>Clarification 1:</i> Instruction focuses on building the Laws of Exponents from specific examples. Refer to the K-12 Formulas (Appendix E) for the Laws of Exponents.</p> <p><i>Clarification 2:</i> Problems in the form $\frac{a^n}{a^m} = p$ must result in a whole-number value for p.</p>			
Assessment Limits			
<p>Items requiring the student to evaluate numerical expressions must incorporate at least one Law of Exponents.</p> <p>Items will require the student to generate an equivalent expression, evaluate an expression, or generate and evaluate an expression.</p>			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
applies the Laws of Exponents to identify equivalent numerical expressions, using whole-number bases with whole-number exponents .	applies the Laws of Exponents to evaluate numerical expressions and identify equivalent numerical expressions, limited to whole-number exponents and rational number bases .	applies the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions, limited to whole-number exponents and rational number bases.	applies the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions, limited to whole number exponents and rational number bases, and provides justification .

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MA.7.NSO.1.2 (Context: Mathematical & Real-World)			
Rewrite rational numbers in different but equivalent forms including fractions, mixed numbers, repeating decimals, and percentages to solve mathematical and real-world problems. Example: Justin is solving a problem where he computes $\frac{17}{3}$ and his calculator gives him the answer 5.6666666667. Justin makes the statement that $\frac{17}{3} = 5.6666666667$; is he correct?			
Benchmark Clarifications			
<i>Clarification 1:</i> Within this benchmark, for addition and subtraction with numbers expressed in scientific notation, exponents are limited to within 2 of each other.			
Assessment Limits			
Items will focus on rewriting fractions that result in repeating decimals only. Repeating decimals are limited to no more than two repeating digits. Items will not focus only on rewriting fractions in mixed number form or improper form.			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
identifies different but equivalent forms of rational numbers including fractions, mixed numbers, repeating decimals, and percentages to solve mathematical problems.	rewrites rational numbers in different but equivalent forms including fractions, mixed numbers, repeating decimals, and percentages to solve mathematical problems.	rewrites rational numbers in different but equivalent forms including fractions, mixed numbers, repeating decimals, and percentages to solve real-world problems.	rewrites rational numbers in different but equivalent forms including fractions, mixed numbers, repeating decimals, and percentages to solve mathematical and real-world problems, and provides justification for the form chosen.

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MA.7.NSO.2.1 (Context: Mathematical)			
Solve mathematical problems using multi-step order of operations with rational numbers including grouping symbols, whole-number exponents, and absolute value.			
Benchmark Clarifications			
<i>Clarification 1:</i> Multi-step expressions are limited to 6 or fewer steps.			
Assessment Limits			
Numerical expressions must be given and must include the use of nested grouping, exponents, and/or absolute value.			
Decimals given in expression are limited to the hundredths place or less.			
Whole number exponents are limited to a value of three or less.			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
solves mathematical problems using order of operations of up to four steps with integers including grouping symbols, whole-number exponents, and absolute value.	solves mathematical problems using multi-step order of operations with positive rational numbers , including grouping symbols, whole-number exponents, and absolute value.	solves mathematical problems using multi-step order of operations with rational numbers including grouping symbols, whole-number exponents, and absolute value.	analyzes an error in a mathematical problem using multi-step order of operations with rational numbers including grouping symbols, whole-number exponents, and absolute value, and justifies the reasoning .

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MA.7.NSO.2.2 (Context: Mathematical)			
Add, subtract, multiply, and divide rational numbers with procedural fluency.			
Benchmark Clarifications			
<i>No Benchmark Clarifications</i>			
Assessment Limits			
Numerical expressions must be given, or items may include a missing term.			
Values in expressions must incorporate at least one negative value and/or rational numbers represented in various forms.			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
adds, subtracts, multiplies, and divides positive rational numbers in the same form.	adds, subtracts, multiplies, and divides rational numbers in the same form.	adds, subtracts, multiplies, and divides rational numbers in different forms with procedural fluency .	(intentionally left blank)

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MA.7.NSO.2.3 (Context: Real-world)			
Solve real-world problems involving any of the four operations with rational numbers.			
Benchmark Clarifications			
<i>Clarification 1:</i> Instruction includes using one or more operations to solve problems.			
Assessment Limits			
Items will incorporate at least one negative value and/or rational numbers represented in various forms.			
Items are not limited to one procedural step.			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
solves real-world problems involving one of the four operations with rational numbers in the same form and at least one number is negative.	solves real-world problems involving one of the four operations with rational numbers and at least one number is a different form and at least one number is a negative.	solves real-world problems involving more than one of the four operations with rational numbers and at least one number is a negative and/or at least one is a different form.	solves real-world problems involving more than one of the four operations with rational numbers and interprets the solution in the context of the situation.

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MA.7.AR.1.1 (Context: Mathematical)			
Apply properties of operations to add and subtract linear expressions with rational coefficients.			
<i>Example:</i> $(7x - 4) - (2 - \frac{1}{2}x)$ is equivalent to $\frac{15}{2}x - 6$.			
Benchmark Clarifications			
<i>Clarification 1:</i> Instruction includes linear expressions in the form $ax \pm b$ or $b \pm ax$, where a and b are rational numbers.			
<i>Clarification 2:</i> Refer to Properties of Operations, Equality, and Inequality (Appendix D) .			
Assessment Limits			
Items assessing MA.7.AR.1.1 must give linear expressions.			
Items assessing MA.7.AR.1.1 are limited to the addition or subtraction of only two linear expressions.			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
applies properties of operations to add and subtract linear expressions with one term having a rational coefficient.	applies properties of operations to add and subtract linear expressions with more than one term having rational coefficients in the same form .	applies properties of operations to add and subtract linear expressions with rational coefficients .	analyzes an error in applying the properties of operation to add and subtract linear expressions with rational coefficients and justifies the reasoning .

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MA.7.AR.1.2 (Context: Mathematical)			
Determine whether two linear expressions are equivalent.			
<i>Example:</i> Are the expressions $\frac{4}{3}(6 - x) - 3x$ and $8 - \frac{5}{3}x$ equivalent?			
Benchmark Clarifications			
<i>Clarification 1:</i> Instruction includes using properties of operations accurately and efficiently.			
<i>Clarification 2:</i> Instruction includes linear expressions in any form with rational coefficients.			
<i>Clarification 3:</i> Refer to Properties of Operations, Equality, and Inequality (Appendix D) .			
Assessment Limits			
Items assessing MA.7.AR.1.1 must give linear expressions.			
Items assessing MA.7.AR.1.1 are limited to the addition or subtraction of only two linear expressions.			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
(intentionally left blank)	determines whether two linear expressions with rational coefficients in the same form are equivalent.	determines whether two linear expressions are equivalent.	justifies why two linear expressions are or are not equivalent using properties of operations.

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MA.7.AR.2.1 (Context: Mathematical & Real-world)			
Write and solve one-step inequalities in one variable within a mathematical context and represent solutions algebraically or graphically.			
Benchmark Clarifications			
<p><i>Clarification 1:</i> Instruction focuses on the properties of inequality. Refer to Properties of Operations, Equality, and Inequality (Appendix D).</p> <p><i>Clarification 2:</i> Instruction includes inequalities in the forms $px > \frac{x}{q}$; $> q$; $x \pm p > q$ and $p \pm x > q$, where p and q are specific rational numbers and any inequality symbol can be represented.</p> <p><i>Clarification 3:</i> Problems include inequalities where the variable may be on either side of the inequality symbol.</p>			
Assessment Limits			
<p>Items will require the student to write an inequality, solve an inequality, or write and solve an inequality.</p> <p>Inequalities will be represented in the form $px > q$, $\frac{x}{p} > q$, $x \pm p > q$, or $p \pm x > q$, and will use the relational symbols $>$, \geq, $<$, or \leq.</p>			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
solves one-step inequalities in one variable within a mathematical context and represents solutions algebraically or graphically.	writes or solves one-step inequalities in one variable within a mathematical context and represents solutions algebraically or graphically.	writes and solves one-step inequalities in one variable within a mathematical context and represents solutions algebraically and graphically.	writes and solves one-step inequalities in one variable within a mathematical context, represents solutions algebraically and graphically, and interprets the solution in context of the situation.

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MA.7.AR.2.2 (Context: Mathematical & Real-world)			
Write and solve two-step equations in one variable within a mathematical or real-world context, where all terms are rational numbers.			
Benchmark Clarifications			
<p><i>Clarification 1:</i> Instruction focuses the application of the properties of equality. Refer to Properties of Operations, Equality, and Inequality (Appendix D).</p> <p><i>Clarification 2:</i> Instruction includes equations in the forms $px \pm q = r$ and $p(x \pm q) = r$, where p, q and r are specific rational numbers.</p> <p><i>Clarification 3:</i> Problems include linear equations where the variable may be on either side of the equal sign.</p>			
Assessment Limits			
Items will require the student to write an equation, solve an equation, or write and solve an equation.			
Equations will be represented in the form $px \pm q = r$ or $p(x \pm q) = r$.			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
solves two-step equations in one variable within a mathematical context, where all terms are rational numbers of the same form.	writes or solves two-step equations in one variable within a mathematical context, where all terms are rational numbers of the same form.	writes and solves two-step equations in one variable within a mathematical or real-world context , where all terms are rational numbers .	writes and solves two-step equations in one variable within a real-world context, where all terms are rational numbers, and interprets the solution in context of the situation.

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MA.7.AR.3.1 (Context: Real-world)			
<p>Apply previous understanding of percentages and ratios to solve multi-step real-world percent problems.</p> <p><i>Example:</i> 23% of the junior population are taking an art class this year. What is the ratio of juniors taking an art class to juniors not taking an art class?</p> <p><i>Example:</i> The ratio of boys to girls in a class is 3: 2. What percentage of the students are boys in the class?</p>			
Benchmark Clarifications			
<p><i>Clarification 1:</i> Instruction includes discounts, markups, simple interest, tax, tips, fees, percent increase, percent decrease and percent error.</p>			
Assessment Limits			
<p>Items may use, but are not limited to, discounts, markups, simple interest, tax, tips, fees, percent increase, percent decrease, or percent error.</p>			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
identifies the ratios to solve real-world percent problems.	identifies the ratios and applies the ratio to solve real-world percent problems.	solves multi-step real-world percent problems.	solves multi-step real-world percent problems and interprets the solution in the context of the situation.

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MA.7.AR.3.2 (Context: Real-world)			
Apply previous understanding of ratios to solve real-world problems involving proportions.			
<p><i>Example:</i> Scott is mowing lawns to earn money to buy a new gaming system and knows he needs to mow 35 lawns to earn enough money. If he can mow 4 lawns in 3 hours and 45 minutes, how long will it take him to mow 35 lawns? Assume that he can mow each lawn in the same amount of time.</p> <p><i>Example:</i> Ashley normally runs 10-kilometer races which is about 6.2 miles. She wants to start training for a half-marathon which is 13.1 miles. How many kilometers will she run in the half-marathon? How does that compare to her normal 10K race distance?</p>			
Benchmark Clarifications			
No Benchmark Clarifications			
Assessment Limits			
N/A			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
given the proportion involving whole numbers , applies ratios to solve real-world problems involving proportions having no conversions.	applies ratios , involving whole numbers, to solve real-world problems involving proportions having no conversions.	applies ratios, involving rational numbers , to solve real-world problems involving proportions.	applies previous understanding of ratios to solve real-world problems involving proportions and interprets the solution in the context of the situation.

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MA.7.AR.3.3 (Context: Mathematical & Real-world)			
Solve mathematical and real-world problems involving the conversion of units across different measurement systems.			
Benchmark Clarifications			
<i>Clarification 1:</i> Problem types are limited to length, area, weight, mass, volume, and money.			
Assessment Limits			
Items that require the student to convert money must give the necessary exchange rate(s).			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
solves mathematical problems involving a single conversion of units across different measurement systems wherein the given measurement is a whole number .	solves mathematical problems involving the conversion of units across different measurement systems.	solves mathematical or real-world problems involving multiple conversions of units across different measurement systems.	solves and interprets the solution in the context of the situation of real-world problems involving multiple conversions of units across different measurement systems.

MA.7.AR.4.1 (Context: Mathematical & Real-world)			
Determine whether two quantities have a proportional relationship by examining a table, graph or written description.			
Benchmark Clarifications			
<i>Clarification 1:</i> Instruction focuses on the connection to ratios and on the constant of proportionality, which is the ratio between two quantities in a proportional relationship.			
Assessment Limits			
Items will not give an equation.			
Items having graphs may include at least two exact points marked on the line and may be labeled with coordinates.			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
determines whether two quantities have a proportional relationship by examining the relationship from a graph	determines whether two quantities have a proportional relationship by examining a table or a graph .	determines whether two quantities have a proportional relationship by examining any of these representations: table, graph, or written description .	determines whether two quantities have a proportional relationship by examining any of these representations: table, graph, or written description; for a proportional relationship, makes the connection between the constant of proportionality and explains that the ratio between the two quantities is a proportional relationship .

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MA.7.AR.4.2 (Context: Mathematical & Real-world)			
Determine the constant of proportionality within a mathematical or real-world context given a table, graph, or written description of a proportional relationship.			
<i>Example:</i> A graph has a line that goes through the origin and the point (5, 2). This represents a proportional relationship, and the constant of proportionality is $\frac{2}{5}$. <i>Example:</i> Gina works as a babysitter and earns \$9 per hour. She can only work 6 hours this week. Gina wants to know how much money she will make. Gina can use the equation $e = 9h$, where e is the amount of money earned, h is the number of hours worked and 9 is the constant of proportionality.			
Benchmark Clarifications			
<i>No Benchmark Clarifications</i>			
Assessment Limits			
Items must state that a relationship is proportional.			
Items will not give an equation.			
Items having graphs may include at least two exact points marked on the line and may be labeled with coordinates.			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
(intentionally left blank)	determines the constant of proportionality within a mathematical context from a table or graph.	determines the constant of proportionality within a mathematical or real-world context from any of these representations: table, graph, or written description of a proportional relationship.	determines and interprets the constant of proportionality within a mathematical or real-world context from any of these representations: table, graph, or written description of a proportional relationship.

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MA.7.AR.4.3 (Context: Mathematical & Real-world)			
Given a mathematical or real-world context, graph proportional relationships from a table, equation, or a written description.			
Benchmark Clarifications			
<i>Clarification 1:</i> Instruction includes equations of proportional relationships in the form of $y = px$, where p is the constant of proportionality.			
Assessment Limits			
Items must state that a relationship is proportional.			
Items will not require a table of values to be generated.			
Items that give an equation will be presented in the form $y = px$.			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
given a mathematical context, graphs proportional relationships from a table .	given a mathematical context, graphs proportional relationships from a table or equation .	given a mathematical or real-world context , graphs proportional relationships from a table, equation, or written description .	given a mathematical or real-world context, graphs proportional relationships from a table, equation, or a written description and uses the graph, table, or equation to find any values in the proportional relationship .

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MA.7.AR.4.4 (Context: Mathematical & Real-world)			
<p>Given any representation of a proportional relationship, translate the representation to a written description, table, or equation</p> <p><i>Example:</i> The written description, there are 60 minutes in 1 hour, can be represented as the equation $m = 60h$.</p> <p><i>Example:</i> Gina works as a babysitter and earns \$9 per hour. She would like to earn \$100 to buy a new tennis racket. Gina wants to know how many hours she needs to work. She can use the equation $h = \frac{1}{9}e$, where e is the amount of money earned, h is the number of hours worked, and $\frac{1}{9}$ is the constant of proportionality.</p>			
Benchmark Clarifications			
<p><i>Clarification 1:</i> Given representations are limited to a written description, graph, table, or equation.</p> <p><i>Clarification 2:</i> Instruction includes equations of proportional relationships in the form of $y = px$, where p is the constant of proportionality.</p>			
Assessment Limits			
<p>Items must state that a relationship is proportional.</p> <p>Items will not require the student to determine whether a given relationship is proportional.</p> <p>Items that give an equation or require the student to write an equation will be presented in the form $y = px$.</p>			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
given any representation except a written description of a proportional relationship, translates the representation into a table or equation.	given a written description of a proportional relationship, translates the representation into a table or equation.	given any representation of a proportional relationship, translates the representation into a written description.	given any representation of a proportional relationship, translates the representation to any of the following: written description, table, or equation, and provides a justification for why the two representations show the same proportional relationship.

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MA.7.AR.4.5 (Context: Real-world)			
Solve real-world problems involving proportional relationships.			
<i>Example:</i> Gordy is taking a trip from Tallahassee, FL to Portland, Maine which is about 1,407 miles. On average his SUV gets 23.1 miles per gallon on the highway and his gas tank holds 17.5 gallons. If Gordy starts with a full tank of gas, how many times will he be required to fill the gas tank?			
Benchmark Clarifications			
<i>No Benchmark Clarifications</i>			
Assessment Limits			
N/A			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
solves one-step real-world problems involving proportional relationships wherein the values are whole numbers .	solves one-step real-world problems involving proportional relationships wherein at least one value is a rational number .	solves multi-step real-world problems involving proportional relationships.	solves real-world problems involving proportional relationships and interprets the solution in the context of the problem .

MA.7.GR.1.1 (Context: Mathematical)			
Apply formulas to find the areas of trapezoids, parallelograms, and rhombi.			
Benchmark Clarifications			
<i>Clarification 1:</i> Instruction focuses on the connection from the areas of trapezoids, parallelograms, and rhombi to the areas of rectangles or triangles.			
<i>Clarification 2:</i> Within this benchmark, the expectation is not to memorize area formulas for trapezoids, parallelograms and rhombi.			
Assessment Limits			
Dimensions that are labeled on figures are limited to base(s) and vertical height only.			
Given parallelograms will not be rectangles or squares.			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
identifies expressions that could be used to find the areas of trapezoids, parallelograms, or rhombi.	applies formulas to find the areas of parallelograms and rhombi.	applies formulas to find the areas of trapezoids, parallelograms, and rhombi.	(intentionally left blank)

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MA.7.GR.1.2 (Context: Mathematical & Real-world)			
Solve mathematical or real-world problems involving the area of polygons or composite figures by decomposing them into triangles or quadrilaterals.			
Benchmark Clarifications			
<i>Clarification 1:</i> Within this benchmark, the expectation is not to find areas of figures on the coordinate plane or to find missing dimensions			
Assessment Limits			
Composed figures must be a polygon with more than four sides. Items using trapezoids, rhombi, or parallelograms are limited to real-world context.			
Given parallelograms will not be rectangles or squares.			
Dimensions that are labeled on quadrilaterals are limited to base(s) and vertical height only.			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
solves mathematical problems involving the area of regular polygons by decomposing them into triangles or quadrilaterals.	solves mathematical problems involving the area of polygons or composite figures by decomposing them into triangles or rectangles.	solves mathematical or real-world problems involving the area of polygons or composite figures by decomposing them into triangles and quadrilaterals.	solves mathematical or real-world problems involving the area of multiple polygons or multiple composite figures by decomposing the shapes in different ways and showing how they are equivalent .

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MA.7.GR.1.3 (Context: Mathematical & Real-world)			
Explore the proportional relationship between circumferences and diameters of circles. Apply a formula for the circumference of a circle to solve mathematical and real-world problems.			
Benchmark Clarifications			
<i>Clarification 1:</i> Instruction includes the exploration and analysis of circular objects to examine the proportional relationship between circumference and diameter and arrive at an approximation of pi (π) as the constant of proportionality. <i>Clarification 2:</i> Solutions may be represented in terms of pi (π) or approximately.			
Assessment Limits			
Items may state whether an answer is to be represented as the exact measure in terms of pi (π) or as an approximation. Items that ask for an approximate answer must allow for the use of the exact value of pi (π) or any common approximation of pi (π).			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
explores the proportional relationship between circumferences and diameters of circles and identifies expressions that could be used for the circumference of a circle to solve mathematical problems when an image is given.	explores the proportional relationship between circumferences and diameters of circles and applies a formula for the circumference of a circle to solve mathematical problems.	explores the proportional relationship between circumferences and diameters of circles; applies a formula for the circumference of a circle to solve mathematical and real-world problems.	applies a formula for the circumference of a circle to solve mathematical and real-world problems, and interprets the solution in the context of the situation.

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MA.7.GR.1.4 (Mathematical & Real-world)			
Explore and apply a formula to find the area of a circle to solve mathematical and real-world problems.			
<i>Example:</i> If a 12-inch pizza is cut into 6 equal slices and Mikel ate 2 slices, how many square inches of pizza did he eat?			
Benchmark Clarifications			
<i>Clarification 1:</i> Instruction focuses on the connection between formulas for the area of a rectangle and the area of a circle.			
<i>Clarification 2:</i> Problem types include finding areas of fractional parts of a circle.			
<i>Clarification 3:</i> Solutions may be represented in terms of pi (π) or approximately.			
Assessment Limits			
Items may state whether an answer is to be represented as the exact measure in terms of pi (π) or as an approximation.			
Items that ask for an approximate answer must allow for the use of the exact value of pi (π) or any common approximation of pi (π)			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
identifies an expression that could be used to find the area of a given circle.	applies a formula to find the area of a circle to solve mathematical problems.	(intentionally left blank)	describes the relationship between the formula for the area of a rectangle and that of a circle; applies a formula to find the area of a circle to solve mathematical and real-world problems; and interprets the solution in the context of the situation.

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MA.7.GR.1.5 (Context: Mathematical & Real-world)			
Solve mathematical and real-world problems involving dimensions and areas of geometric figures, including scale drawings and scale factors.			
Benchmark Clarifications			
<p><i>Clarification 1:</i> Instruction focuses on seeing the scale factor as a constant of proportionality between corresponding lengths in the scale drawing and the original object.</p> <p><i>Clarification 2:</i> Instruction includes the understanding that if the scaling factor is k, then the constant of proportionality between corresponding areas is k^2.</p> <p><i>Clarification 3:</i> Problem types include finding the scale factor given a set of dimensions as well as finding dimensions when given a scale factor.</p>			
Assessment Limits			
N/A			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
identifies the scale factor in mathematical problems involving dimensions of geometric figures.	solves mathematical problems involving dimensions and areas of geometric figures, including scale drawings and scale factors .	(intentionally left blank)	solves mathematical or real-world problems involving dimensions and areas of geometric figures, including scale drawings and scale factors, and interprets the solution in context of the situation .

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MA.7.GR.2.1 (Context: Mathematical & Real-world)			
Given a mathematical or real-world context, find the surface area of a right circular cylinder using the figure's net.			
Benchmark Clarifications			
<p><i>Clarification 1:</i> Instruction focuses on representing a right circular cylinder with its net and on the connection between surface area of a figure and its net.</p> <p><i>Clarification 2:</i> Within this benchmark, the expectation is to find the surface area when given a net or when given a three-dimensional figure.</p> <p><i>Clarification 3:</i> Within this benchmark, the expectation is not to memorize the surface area formula for a right circular cylinder.</p> <p><i>Clarification 4:</i> Solutions may be represented in terms of pi (π) or approximately.</p>			
Assessment Limits			
<p>Items will not require the student to use the surface area formula.</p> <p>Items may give an image of the three-dimensional figure and require the student to identify the appropriate net with dimensions and find the surface area.</p> <p>Items may state whether an answer is to be represented as the exact measure in terms of pi (π) or as an approximation.</p> <p>Items that ask for an approximate answer must allow for the use of the exact value of pi (π) or any common approximation of pi (π).</p>			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
given a net in a mathematical or real-world context, determines the corresponding right circular cylinder, or, given the right circular cylinder, determines the corresponding net.	given a mathematical context, finds the surface area of a right circular cylinder given the figure's net.	(intentionally left blank)	adds, subtracts, multiplies, and divides numbers expressed in scientific notation, including combinations of these operations.

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MA.7.GR.2.2 (Context: Real-world)			
Solve real-world problems involving surface area of right circular cylinders.			
Benchmark Clarifications			
<i>Clarification 1:</i> Within this benchmark, the expectation is not to memorize the surface area formula for a right circular cylinder or to find radius as a missing dimension.			
<i>Clarification 2:</i> Solutions may be represented in terms of pi (π) or approximately.			
Assessment Limits			
Items must include a formula for surface area of a right circular cylinder, including context where the right circular cylinder may include one or two circular bases.			
Items may state whether an answer is to be represented as the exact • measure in terms of pi (π) or as an approximation.			
Items that ask for an approximate answer must allow for the use of the exact value of pi (π) or any common approximation of pi (π).			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
determines the expression that can be used to find the surface area for a given visual model with labeled dimensions for a right circular cylinder.	solves real-world problems involving surface area of right circular cylinders using a visual model.	(intentionally left blank)	solves real-world problems involving surface area of right circular cylinders, and interprets the solution in the context of the situation.

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MA.7.GR.2.3 (Context: Mathematical & Real-world)			
Solve mathematical and real-world problems involving volume of right circular cylinders.			
Benchmark Clarifications			
<i>Clarification 1:</i> Within this benchmark, the expectation is not to memorize the volume formula for a right circular cylinder or to find radius as a missing dimension.			
<i>Clarification 2:</i> Solutions may be represented in terms of pi (π) or approximately.			
Assessment Limits			
Items may state whether an answer is to be represented as the exact measure in terms of pi (π) or as an approximation.			
Items that ask for an approximate answer must allow for the use of the exact value of pi (π) or any common approximation of pi (π).			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
determines the expression that could be used to find the volume of right circular cylinders using a visual model.	solves mathematical problems involving volume of right circular cylinders using a visual model.	(intentionally left blank)	solves mathematical or real-world problems involving volume of right circular cylinders, and interprets the solution in the context of the situation.

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MA.7.DP.1.1 (Context: Real-world)			
Determine an appropriate measure of center or measure of variation to summarize numerical data, represented numerically or graphically, taking into consideration the context and any outliers			
Benchmark Clarifications			
<p><i>Clarification 1:</i> Instruction includes recognizing whether a measure of center or measure of variation is appropriate and can be justified based on the given context or the statistical purpose.</p> <p><i>Clarification 2:</i> Graphical representations are limited to histograms, line plots, box plots and stem-and-leaf plots.</p> <p><i>Clarification 3:</i> The measure of center is limited to mean and median. The measure of variation is limited to range and interquartile range.</p>			
Assessment Limits			
Items may require the student to select the reasons why a certain measure should be chosen based on given context, statistical purpose, or outliers in data.			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
identifies if the data set contains an outlier.	determines an appropriate measure of center or measure of variation to summarize numerical data, represented graphically without outliers in a given context.	determines an appropriate measure of center or measure of variation to summarize numerical data, represented numerically or graphically , taking into consideration the context with outliers .	determines an appropriate measure of center or measure of variation to summarize numerical data, represented numerically or graphically, and compares the effect of the outlier on each measure of data .

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MA.7.DP.1.2 (Context: Real-world)			
Given two numerical or graphical representations of data, use the measure(s) of center and measure(s) of variability to make comparisons, interpret results and draw conclusions about the two populations.			
Benchmark Clarifications			
<p><i>Clarification 1:</i> Graphical representations are limited to histograms, line plots, box plots and stem-and-leaf plots.</p> <p><i>Clarification 2:</i> The measure of center is limited to mean and median. The measure of variation is limited to range and interquartile range.</p>			
Assessment Limits			
<p>Numerical data sets are limited to no more than 20.</p> <p>Items will not require the student to calculate mean with data sets containing more than 10 data points.</p>			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
given two numerical representations of data, calculates the means, medians, and ranges , and uses those measures to make comparisons between the two populations.	given two graphical representations of data, calculates and/or determines the measures of center or measures of variability , and uses those measures to make comparisons and interpret results about the two populations.	given two numerical or graphical representations of data, calculates and/or determines the measures of center and measures of variability, and uses those measures to make comparisons, interpret results, and draw conclusions about the two populations.	given two numerical or graphical representations of data, calculates and/or determines the measures of center and measures of variability and uses those measures to make comparisons, interpret results, draw conclusions, and make predictions about the two populations.

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MA.7.DP.1.3 (Context: Real-world)			
Given categorical data from a random sample, use proportional relationships to make predictions about a population.			
<i>Example:</i> O'Neill's Pillow Store made 600 pillows yesterday and found that 6 were defective. If they plan to make 4,300 pillows this week, predict approximately how many pillows will be defective.			
<i>Example:</i> A school district polled 400 people to determine if it was a good idea to not have school on Friday. 30% of people responded that it was not a good idea to have school on Friday. Predict the approximate percentage of people who think it would be a good idea to have school on Friday from a population of 6,228 people.			
Benchmark Clarifications			
<i>No Benchmark Clarifications</i>			
Assessment Limits			
The random sample of a population must have a size of at least 100.			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
given categorical data from a random sample, identifies a ratio that describes the proportional relationship .	given categorical data from a random sample, determines the ratio that can be used to make predictions about a population.	given categorical data from a random sample, uses proportional relationships to make predictions about a population.	given categorical data from a random sample, uses proportional relationships, make predictions, and make suggestions for improving the likelihood of the prediction .
MA.7.DP.1.4 (Context: Real-world)			
Use proportional reasoning to construct, display, and interpret data in circle graphs.			
Benchmark Clarifications			
<i>Clarification 1:</i> Data is limited to no more than 6 categories.			
Assessment Limits			
Category data in the circle graph will be represented as a fraction or percentage of the whole data set.			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
uses proportional reasoning to construct and display data of no more than four categories in circle graphs.	uses proportional reasoning to construct, display, and interpret data of no more than four categories in circle graphs.	uses proportional reasoning to construct, display, and interpret data for up to six categories in circle graphs.	(intentionally left blank)

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MA.7.DP.1.5 (Context: Real-world)			
Given a real-world numerical or categorical data set, choose and create an appropriate graphical representation.			
Benchmark Clarifications			
<i>Clarification 1:</i> Graphical representations are limited to histograms, bar charts, circle graphs, line plots, box plots and stem-and-leaf plots.			
Assessment Limits			
<ul style="list-style-type: none"> • Items must include a real-world scenario with a data set to provide reasoning for the most appropriate graphical representation. • For circle graphs, data is limited to no more than six categories. 			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
given a real-world numerical data set , chooses an appropriate graphical representation.	given a real-world numerical or categorical data set , chooses an appropriate graphical representation.	given a real-world numerical or categorical data set, chooses and creates an appropriate graphical representation.	(intentionally left blank)

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MA.7.DP.2.1 (Context: Real-world)			
Determine the sample space for a simple experiment.			
Benchmark Clarifications			
<i>Clarification 1:</i> Simple experiments include tossing a fair coin, rolling a fair die, picking a card randomly from a deck, picking marbles randomly from a bag and spinning a fair spinner.			
Assessment Limits			
Items including a deck of cards are not limited to a standard 52-card deck, and may include, but are not limited to, cards containing names, letters of the alphabet, a variety of colors, or the like.			
Items including a fair die are not limited to a standard 6-sided die and may include a variety of sides.			
Items including a fair die are not limited to including consecutive sequential numbers and may include repeated or not repeated, colors, shapes, words, numbers, or the like.			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
determines the sample space for a single experiment involving tossing a fair coin or rolling a fair die.	determines the sample space for a simple experiment with non-repeated elements (for example a bag containing 1 red marble, 1 green marble, and 1 yellow marble).	determines the sample space for a simple experiment including repeated elements (such as a bag containing 2 red marbles, 1 green marble, and 3 yellow marbles).	(intentionally left blank)

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MA.7.DP.2.2 (Context: Real-world)			
Given the probability of a chance event, interpret the likelihood of it occurring. Compare the probabilities of chance events.			
Benchmark Clarifications			
<p><i>Clarification 1:</i> Instruction includes representing probability as a fraction, percentage, or decimal between 0 and 1 with probabilities close to 1 corresponding to highly likely events and probabilities close to 0 corresponding to highly unlikely events.</p> <p><i>Clarification 2:</i> Instruction includes $P(event)$ notation.</p> <p><i>Clarification 3:</i> Instruction includes representing probability as a fraction, percentage, or decimal.</p>			
Assessment Limits			
<p>Probability will be represented using a fraction or decimal with a value between 0 and 1, inclusive, or by a percentage.</p> <p>Items may require the student to identify probabilities that are closer to 1 as likely or probabilities that are closer to 0 as unlikely.</p> <p>Items may use the notation $P(event)$ to state probability of an event.</p>			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
classifies a given probability of a chance event written as a percentage or decimal as likely or unlikely.	given the probability of a chance event, interprets the likelihood of it occurring and compares probabilities of chance events wherein the probabilities are given in the same form.	given the probability of a chance event, interprets the likelihood of it occurring and compares probabilities of chance events wherein the probabilities are given in different forms.	(intentionally left blank)

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MA.7.DP.2.3 (Context: Real-world)			
Find the theoretical probability of an event related to a simple experiment			
Benchmark Clarifications			
<i>Clarification 1:</i> Instruction includes representing probability as a fraction, percentage, or decimal.			
<i>Clarification 2:</i> Simple experiments include tossing a fair coin, rolling a fair die, picking a card randomly from a deck, picking marbles randomly from a bag and spinning a fair spinner.			
Assessment Limits			
Probability will be represented using a fraction or decimal with a value between 0 and 1, inclusive, or by a percentage.			
Items including a deck of cards are not limited to a standard 52-card deck, and may include, but are not limited to, cards containing names, letters of the alphabet, a variety of colors, or the like.			
Items including a fair die are not limited to a standard 6-sided die and may include a variety of sides.			
Items including a fair die are not limited to including consecutive sequential numbers and may include repeated or not repeated, colors, shapes, words, numbers, or the like			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
finds the theoretical probability of an event related to a simple experiment, which include tossing a fair coin or rolling a fair die , and expresses that probability as a fraction.	finds the theoretical probability of an event related to a simple experiment, which include tossing a fair coin, rolling a fair die, picking a card randomly from a deck, picking marbles randomly from a bag, and spinning a fair spinner , and expresses that probability as a fraction.	finds the theoretical probability of an event related to a simple experiment, which include tossing a fair coin, rolling a fair die, picking a card randomly from a deck, picking marbles randomly from a bag, and spinning a fair spinner, and expresses that probability as a percentage and/or as a decimal.	analyzes an error in finding the theoretical probability of an event related to a simple experiment and justifies the reasoning.

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MA.7.DP.2.4 (Context: Real-world)			
Use a simulation of a simple experiment to find experimental probabilities and compare them to theoretical probabilities.			
<i>Example:</i> Investigate whether a coin is fair by tossing it 1,000 times and comparing the percentage of heads to the theoretical probability 0.5.			
Benchmark Clarifications			
<i>Clarification 1:</i> Instruction includes representing probability as a fraction, percentage, or decimal.			
<i>Clarification 2:</i> Instruction includes recognizing that experimental probabilities may differ from theoretical probabilities due to random variation. As the number of repetitions increases experimental probabilities will typically better approximate the theoretical probabilities.			
<i>Clarification 3:</i> Experiments include tossing a fair coin, rolling a fair die, picking a card randomly from a deck, picking marbles randomly from a bag and spinning a fair spinner.			
Assessment Limits			
Probability will be represented using a fraction or decimal with a value between 0 and 1, inclusive, or by a percentage.			
If given a simulation, the item must have a minimum number of 100 trials.			
Items including a deck of cards are not limited to a standard 52-card deck, and may include, but are not limited to, cards containing names, letters of the alphabet, a variety of colors, or the like.			
Items including a fair die are not limited to a standard 6-sided die and may include a variety of sides.			
Items including a fair die are not limited to consecutive sequential numbers and may include repeated or not repeated, colors, shapes, words, numbers, or the like.			
Achievement Level Descriptors			
Level 2	Level 3	Level 4	Level 5
uses a simulation of a simple experiment to find experimental probabilities.	uses a simulation of a simple experiment to find experimental probabilities and compare them to theoretical probabilities and expresses that probability as a fraction.	uses a simulation of a simple experiment to find experimental probabilities and compare them to theoretical probabilities and expresses that probability as a percentage and/or as a decimal.	uses a simulation of a simple experiment to find experimental probabilities and compare them to theoretical probabilities, and expresses that probability as a percentage, fraction, and/or as a decimal, and explains the relationship between the number of trials of an experiment and its theoretical probability