LEAP Assessment Guide, Mathematics Grade 8

This guide includes:

I. Purpose of Assessment Guide

This document is designed to assist Louisiana educators in understanding the LEAP mathematics assessment for grade 8, which will be administered in spring 2016.

II. Introduction to LEAP

All students in grades 3–8 will take the LEAP ELA and mathematics assessments. In order for Louisiana to maintain comparability between assessments administered in spring 2015 and spring 2016, a percentage of the items (not more than 49.9%) for the LEAP assessments comes from the Partnership for Assessment of Readiness for College and Careers (PARCC). PARCC is a group of states working together to develop high-quality assessments. The remaining percentage of items for the LEAP assessments comes from the College and Career Readiness Item Bank belonging to Data Recognition Corporation, winner of the LEAP mathematics and ELA test development contract.

The LEAP assessments will offer the following:

- Consistency with the rigor and types of questions used in the spring 2015 Louisiana assessments
- Measurement of the full range of Louisiana content standards in ELA and mathematics
- Ability to measure the full range of student performance, including the performance of high- and low-performing students

- Flexibility in test administration, with both paper- and computer-based testing available
- Information for educators and parents about student readiness in ELA and mathematics and whether students are "on track" for college and careers
- Comparison of Louisiana student performance with the performance of students in other states

III. Overview of LEAP Mathematics Task Types and Reporting Categories

Each item on the LEAP assessment is referred to as a task and is identified by one of three types: Type I, Type II, and Type III. As shown in the table below, each of the three task types is aligned to one of four reporting categories (also called sub-claims): major content, additional and supporting content, reasoning, and modeling. Each task type is designed to align with at least one of the Standards for Mathematical Practice (MP).

Task Type	Description	Sub-Claim	Mathematical Practice(s)
Type I	conceptual understanding, fluency, and application	**Sub-Claim A:** solve problems involving the major content for grade 8 **Sub-Claim B:** solve problems involving the additional and supporting content for grade 8	can involve any or all practices
Type II	written arguments/ justifications, critique of reasoning, or precision in mathematical statements	**Sub-Claim C:** express mathematical reasoning by constructing mathematical arguments and critiques	primarily MP.3 and MP.6, but may also involve any of the other practices
Type III	modeling/application in a real-world context or scenario	**Sub-Claim D:** solve real-world problems engaging particularly in the modeling practice	primarily MP.4, but may also involve any of the other practices

These reporting categories are the same as the reporting categories on the spring 2015 mathematics student reports and will provide parents and educators valuable information about

- overall student performance, including readiness to continue further studies in mathematics;
- student performance broken down by mathematics subcategories, which may help identify when students need additional support or more challenging work; and
- how well schools and districts are helping students achieve higher expectations.

IV. Design of LEAP Mathematics Assessments

The LEAP mathematics assessment in grade 8 contains a total of 66 points. The table below shows the breakdown of task types and point values.

Grade 8 Mathematics Test Design				
Test Session	Type I (points)	Type II (points)	Type III (points)	Total (points)
Session 1: No Calculator	20	0	0	20
Session 2: Calculator	10	7	6	23
Session 3: Calculator	10	7	6	23

V. Assessable Content

The tasks on the LEAP mathematics test are aligned directly to the Louisiana Mathematics Standards for all sub-claims. Type I tasks, designed to assess conceptual understanding, fluency, and application, are aligned to the major content for grade 8 (reported in sub-claim A) and additional and supporting content for grade 8 (reported in sub-claim B). Type II tasks are designed to assess student reasoning ability of the major content for grade 8 in applied contexts (reported in sub-claim C). Type III tasks are designed to assess student modeling ability of selected content for grades 7 or 8 content in applied contexts (reported in sub-claim D). Type II and III tasks are further aligned to PARCC evidence statements for sub-claims C and D. See the table in the Appendix (section VIII of this document) for a listing of assessable content of the Louisiana Mathematics Standards and PARCC evidence statements.

VI. LEAP Test Administration Policies

Administration Schedule

The spring LEAP ELA and mathematics assessments will be administered during **one** testing window and will be available to districts as paper-based tests (PBT) and computer-based tests (CBT). The table below lists the PBT administration schedule for the spring ELA, mathematics, and science assessments.

	Paper–Based Test Administration Schedule: Grade 8	
Day 1 **April 25**	English Language Arts Session 1: Research Simulation Task	90 minutes
	Mathematics Session 1: No Calculator	75 minutes
Day 2 **April 26**	English Language Arts Session 2: Literary Analysis Task **OR** Narrative Writing Task + 1-2 passage sets	75 minutes
	Mathematics Session 2: Calculator	75 minutes
Day 3 **April 27**	English Language Arts Session 3: Reading Literary and Informational Texts	75 minutes
	Mathematics Session 3: Calculator	75 minutes
Day 4 **April 28**	Science Session 1: Multiple-choice	Suggested time: 60 minutes
	Science Session 2: Short Answer	Suggested time: 30 minutes
	Science Session 3: Task	Suggested time: 30 minutes
Day 5 **April 29**	Make–Up Sessions	Depends on session

The table below lists the CBT administration schedule and policies for the spring ELA and mathematics assessments.

Computer-Based Test Administration Schedule: Grade 8		
Test Window: April 11, 2016 – May 6, 2016		
English Language Arts	Session 1: Research Simulation Task	90 minutes
Mathematics	Session 1: No Calculator	75 minutes
English Language Arts	Session 2: Literary Analysis Task **OR** Narrative Writing Task + 1-2 passage sets	75 minutes
Mathematics	Session 2: Calculator	75 minutes
English Language Arts	Session 3: Reading Literary and Informational Texts	75 minutes
Mathematics	Session 3: Calculator	75 minutes
Computer-Based Test Administration Policies: For the administration of the computer-based tests, schools must follow the policies below.		
- Sessions must be completed in the order listed above. - No more than two sessions can be scheduled per day (one English Language Arts and one Mathematics). - Students must be provided breaks between sessions. - All students in a particular grade must be tested on the same session at the same time as or as close to the same time as possible. If not possible, schools should have procedures in place to isolate students who have tested from those who are waiting to test. - Make-up sessions must be administered as soon as a student returns to school.		

The LEAP ELA and mathematics tests are **strictly timed** and no additional time is permitted, except for students who have a documented extended time accommodation (e.g., an IEP).

Paper-Based Tests

Students taking the paper-based tests, except those using braille test materials, will enter all answers in their test booklets. There will be no separate answer documents. Each session of the mathematics test booklet will be sealed; day indicator bars will appear on the outside margin of each page. Instructions for how to manage the test booklets, including how to break the seals, will be outlined in the Test Administration Manual.

Multiple-Choice tasks have four options. Students will shade the bubble of the correct answer.

(A) Option A

(B) Option B

(●C) Option C

(D) Option D

Multiple-Select tasks for grade 8 have five to seven options. Students will fill in the number of correct answers based on the question. The number of correct answers will vary from task to task.

(●A) Option A

(B) Option B

(●C) Option C

(D) Option D

(E) Option E

(F) Option F

Fill-in-the-Blank Grids

The grid for grade 8 has a column for entering and shading a bubble when the answer is negative. See the example in the grid on the left below. Students will write the number in the boxes at the top of the grid. Numbers are entered **without** commas. Students will then shade the bubble in the column that corresponds to the entry in the top row. The recommended method for entry of the digits and a decimal point (if needed) is to start in column 2 as shown in the two examples on the left. Blank spaces within the answer are not allowed. Equivalent forms of numbers, such as 0.75 or 0.750 for .75 as shown in the second example, are accepted providing that the response fits within any rounding limits that may be required by the question. For example, if a question requires the response to be rounded to the hundredths place, 0.75 or .75 would be accepted as correct, whereas 0.750 would not be.

Enter digit or decimal point starting in column 2. Do not skip boxes when entering the number.

Use only if answer is a negative number.

Note: Should a student mistakenly start in a column other than column 2, the entry will be scored as correct under the following conditions:
- There are no spaces within the answer.
- The answer fits within the remaining columns.
- The negative symbol is used when the answer is a negative number.

Fractional Answers

Type I tasks with potential fractional answers in PBT forms will be presented in multiple-choice or multiple-select formats. Students will be expected to be able to correctly write and apply fractions in Type II (reasoning) and Type III (modeling) constructed-response tasks.

Answering Type II and Type III Tasks

When answering Type II (reasoning) and Type III (modeling) tasks, students need to make sure to write their explanations and/or to show their work in the box provided for each question. Any information written outside the box or which has been scratched out will not be scored.

The following information presents guidelines for marking/writing in the mathematics test booklet.

- Students may use yellow highlighters to highlight text in the test booklet.
- Students may write and do scratch work in the test booklet, but must avoid making stray marks in the answer circles on the multiple-choice and multiple-select tasks or in the fill-in-the-blank grids.
- Highlighting text in options and placing an X to the right of the text in an option are recommended ways for students to eliminate options. However, crossing out options could create scoring issues if students mark through answer circles.

Computer-Based Tests

Students taking the computer-based tests will enter their answers into the online testing system. The way each answer is entered depends on the task type. For example, for a multiple-choice task, a student will select the circle next to the correct answer. For fill-in-the-blank and constructed-response tasks on online test forms, students will type in the number (integer or decimal) or text in the box using the typing tools provided. Some response boxes limit the length of the response that can be typed and whether numbers and/or text can be typed.

Computer-based tests allow for the use of technology enhanced items (TEI) that use innovative, engaging ways to assess student understanding of material beyond the limitations of a traditional selected-response task. A TEI may require the student to sort shapes into categories by using a drag-and-drop tool, show a fraction or an area by selecting cells in a figure, or create angles by rotating rays.

The computer-based tests include the following online tools, which allow a student to select answer choices, "mark" tasks, eliminate answer options, take notes, enlarge the task, guide the reading of a task line by line, use a calculator, use a ruler, see the mathematics reference sheet, and use an equation builder for entering special characters (similar to what a student can do on the paper-based tests). A help tool is also featured to assist students as they use the online system.

- Pointer tool
- Highlighter tool
- Cross-Off tool
- Calculator

- Sticky Note tool
- Magnifying tool
- Line Guide
- Mathematics Reference Sheet

- Measurement tools
- Equation Builder
- Help tool

All students taking the computer-based tests should work through the Online Tools Training to practice using the online tools so they are well prepared to navigate the online testing system.

Permitted Testing Materials

The chart that follows summarizes the tools and resources for the grade 8 mathematics assessment.

ASSESSMENT RESOURCES/TOOLS FOR GRADE 8

Provided (by vendor or part of online system)	Required (provided by school)	Other Allowable (may be used, not required)
$\frac{1}{8}$ -inch and centimeter ruler and mathematics reference sheet	Scratch paper (lined, graph, or un-lined)	Yellow highlighter, protractor, tracing paper, reflection tools, straight edge, and compass

Provided tools are sent by the test vendor to the districts for the districts to distribute during testing; districts and students may **not** substitute their own tools for provided tools. Required tools must be supplied by the school and distributed to all testers during testing. Schools may give or permit students to bring *allowable* tools. If schools permit students to bring their own *allowable* tools, tools must be given to the test administrator prior to testing to ensure that the tools are appropriate for testing (e.g., tools do not have any writing on them).

Grade 8 ruler provided on the LEAP paper-based mathematics assessment (not actual size):
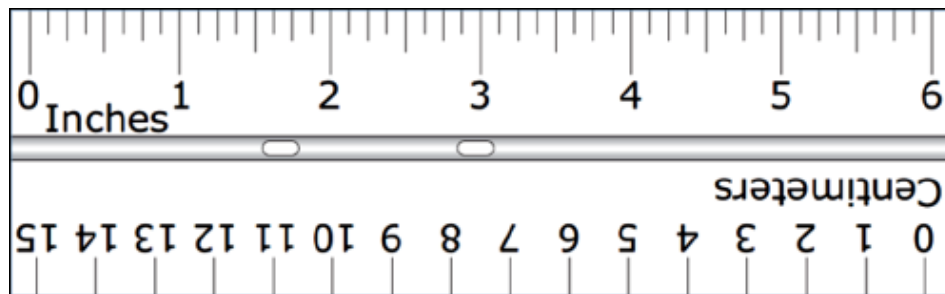
Grade 8 rulers provided on the LEAP computer-based mathematics assessment (not actual size):
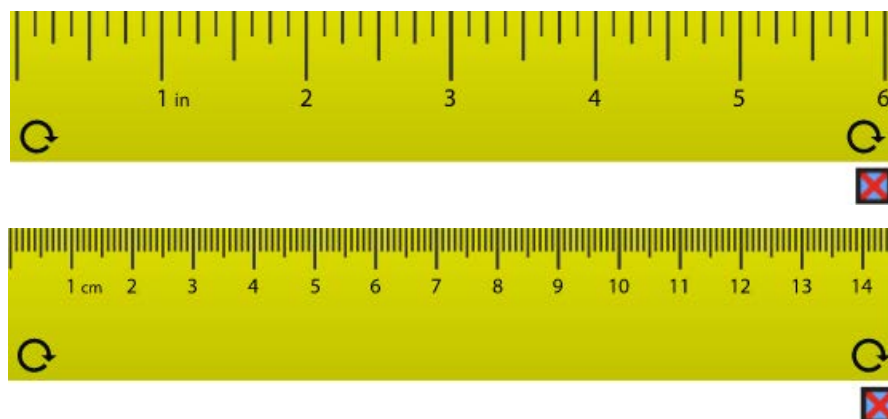
To ensure accurate measurement, the size of the computer-based ruler, along with the object being measured, varies depending on the computer monitor's resolution. To practice with the computer-based ruler and protractor, please visit the Online Tools Training.

Calculators

The LEAP mathematics test allows a scientific calculator in grade 8 during Sessions 2 and 3. Calculators are **not** allowed during Session 1 of the test. For students with the approved accommodation, a scientific calculator is allowed during all test sessions. The student should use the calculator they have regularly used throughout the school year in their classroom and are most familiar with, provided their regular-use calculator is not outside the boundaries of what is allowed. The following table includes calculator information by session for both general testers and testers with approved accommodations for calculator use.

UPDATE: Clarification of Calculator Policy

Test Mode	PBT			CBT		
Session	Session 1	Session 2	Session 3	Session 1	Session 2	Session 3
Testers	Not allowed	Scientific, hand-held	Scientific, hand-held	Not allowed	Scientific, online available may also have hand-held	Scientific, online available may also have hand-held
Testers with approved accommodation for calculator use	Scientific, hand-held	Scientific, hand-held	Scientific, hand-held	Scientific, hand-held	Scientific, online available may also have hand-held	Scientific, online available may also have hand-held

Additional information for testers with approved accommodations for calculator use:
- Students may also use a hand-held four-function calculator **in addition to** the scientific calculator, provided the accommodation is documented. The four-function calculator may have square root, percent, memory, and +/- keys.
- If a student needs an adaptive calculator (e.g., large key, talking), the student may bring his or her own or the school may provide one, as long as it is specified in his or her approved IEP or 504 Plan.

Additionally, schools must adhere to the following guidance regarding calculators:
- Calculators with Computer Algebra System (CAS) features are **not** allowed.
- Tablet, laptop (or PDA), or phone-based calculators are **not** allowed.
- Students are **not** allowed to share calculators within a testing session.
- Test administrators must confirm that memory on all calculators has been cleared before and after the testing sessions.
- Calculators with "QWERTY" keyboards are **not** permitted.
- If schools or districts permit students to bring their own hand-held calculators, test administrators must confirm that the calculators meet all the requirements as defined above.

Reference Sheets

Students in grade 8 will be provided a reference sheet with the information below.

Grade 8 Reference Sheet

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 = 5280 feet	1 pound = 0.454 kilogram	1 quart = 2 pints
1 mile = 1760 yards	1 kilogram = 2.2 pounds	1 gallon = 4 quarts
1 mile = 1.609 kilometers	1 ton = 2000 pounds	1 gallon = 3.785 liters
		1 liter = 0.264 gallon
		1 liter = 1000 cubic centimeters

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

Requisite Knowledge

Students in grade 8 will be required to know relative sizes of measurement units within one system of units. Therefore, the following requisite knowledge is necessary for the grade 8 assessments and is **not** provided in the reference sheet.

1 meter = 100 centimeters	1 gram = 1000 milligrams	1 day = 24 hours
1 meter = 1000 millimeters	1 liter = 1000 milliliters	1 minute = 60 seconds
1 kilometer = 1000 meters	1 foot = 12 inches	1 hour = 60 minutes
1 kilogram = 1000 grams	1 yard = 3 feet	Area formulas for rectangles

For more information about accessibility and accommodations, please refer to the 2015–2016 LEAP Accessibility Features and Accommodations Overview.

VII. Resources

UPDATE:
Links to More
Resources

- [Grades 6–8 Math Guidebook](#): offers comprehensive information to support teachers in creating yearly, unit, and daily instructional plans for students

- [Grades 6–8 Math Teacher Library](#): provides links to grade-specific resources, such as the standards, shared teacher resources, and instructional plans

- [EAGLE Sample Test Items](#): provides teachers a bank of questions that can be used for instructional and assessment purposes

- [2014–2015 Grade 8 Practice Test](#): provides teachers and students with additional tasks that are similar to the tasks on the 2016 test, but should not be administered as a "practice test" because test designs for 2015 and 2016 are not the same

- [PARCC's Grade 8 Math Released Items](#): provides teachers and students with actual test items from the PARCC 2015 test, including rubrics, alignment, and scoring information

- [2015–2016 Grade 8 LEAP Practice Test](#) and [Scoring Guide](#): offers samples of paper-based grade-level practice tests to help prepare students for the spring assessments

- 2015-2016 Grade 8 Online LEAP Practice Test, [Scoring Guide](#), and [Answer Sheet](#): offers samples of computer-based grade-level practice tests to help prepare students for the spring assessments; the online practice test is accessed through INSIGHT

- Online Tools Training: provides teachers and students examples of interactive, technology-enhanced items so they can become familiar with the computer-based testing format

- [2015–2016 LEAP Accessibility Features and Accommodations Overview](#): provides an overview of Louisiana's accessibility features and accommodations for grades 3-8 spring 2016 testing, clarifying differences between paper-based and online testing

- [2015-2016 LEAP Mathematics Practice Test Guidance](#): provides teachers with information about test structure, recommended uses, general cautions, item types, and scoring of the paper-based and computer-based LEAP tests

- [Guide to the LEAP Online Equation Builder Grades 6-8](#): provides teachers with information on using the equation builder within the open-response boxes on the CBT

- [Guide to Administering the Online Practice Tests](#): provides information regarding the administration and scoring process needed for the online practice tests

VIII. Appendix

Assessable Content for Sub-Claim A (Major Content)

Sub-Claim A: Major Content	
8.EE.A	**Expressions and equations work with radicals and integer exponents.**
8.EE.A.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.
8.EE.A.2	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.
8.EE.A.3	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. *For example, estimate the population of the United States as 3 times 10^8 and the population of the world as 7 times 10^9, and determine that the world population is more than 20 times larger.*
8.EE.A.4	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.
8.EE.B	**Understand the connections between proportional relationships, lines, and linear equations.**
8.EE.B.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.
8.EE.B.6	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.
8.EE.C	**Analyze and solve linear equations and pairs of simultaneous linear equations.**
8.EE.C.7	Solve linear equations in one variable. a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers). b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
8.EE.C.8	Analyze and solve pairs of simultaneous linear equations. a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.* c. Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.*
8.F.A	**Define, evaluate, and compare functions.**
8.F.A.1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.[1]

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[1] Function notation is not required for grade 8.

8.F.A.2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change*.
8.F.A.3	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line*.
8.G.A	**Understand congruence and similarity using physical models, transparencies, or geometry software.**
8.G.A.1	Verify experimentally the properties of rotations, reflections, and translations: a. Lines are taken to lines, and line segments to line segments of the same length. b. Angles are taken to angles of the same measure. c. Parallel lines are taken to parallel lines.
8.G.A.2	Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
8.G.A.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
8.G.A.4	Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
8.G.A.5	Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so*.
8.G.B	**Understand and apply the Pythagorean Theorem.**
8.G.B.6	Explain a proof of the Pythagorean Theorem and its converse.
8.G.B.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
8.G.B.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

UPDATE: 8.F.B moved from Sub-claim A to Sub-claim B in accordance with recent updates to PARCC *Model Content Frameworks*

Assessable Content for Sub-Claim B (Additional and Supporting Content)

Sub-Claim B: Additional and Supporting Content	
8.NS.A	**Know that there are numbers that are not rational, and approximate them by rational numbers.**
8.NS.A.1	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
8.NS.A.2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). *For example, by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.*
8.F.B	**Use functions to model relationships between quantities.**
8.F.B.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
8.F.B.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
8.G.C	**Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.**
8.G.C.9	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
8.SP.A	**Investigate patterns of association in bivariate data.**
8.SP.A.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
8.SP.A.2	Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.
8.SP.A.3	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. *For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.*
8.SP.A.4	Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*

Assessable Content for Sub-Claim C (Reasoning Applications)

Sub-Claim C: Reasoning Applications
Base reasoning on the principle that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane. Content Scope: Knowledge and skills articulated in • 8.EE.B.6 - Tasks require students to derive the equation $y=mx$ for a line through the origin and the equation $y=mx+b$ for a line intersecting the vertical axis at b. • 8.EE.C.8a
Given an equation or system of equations, present the solution steps as a logical argument that concludes with the set of solutions (if any). Content Scope: Knowledge and skills articulated in • 8.EE.C.7a, 8.EE.C.7b, 8.EE.C.8b - Tasks may have three equations, but students are only required to analyze two equations at a time.
Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. Content Scope: Knowledge and skills articulated in • 8.F.A.3 – Tasks require students to justify whether a given function is linear or nonlinear. • 8.G.A.2, 8.G.A.4 • 8.G.A.5 • 7.RP.A, 7.NS.A, 7.EE.A – Tasks may have scaffolding.[2]
Present solutions to multi-step problems in the form of valid chains of reasoning, using symbols such as equals signs appropriately (for example, rubrics award less than full credit for the presence of nonsense statements such as 1 + 4 = 5 + 7 = 12, even if the final answer is correct), or identify or describe errors in solutions to multi-step problems and present corrected solutions. Content Scope: Knowledge and skills articulated in • 8.EE.C.8c
Apply geometric reasoning in a coordinate setting, and/or use coordinates to draw geometric conclusions. Content Scope: Knowledge and skills articulated in • 8.EE.B.6 • 8.G.A.2, 8.G.A.4 • 8.G.B - Some of tasks require students to use the converse of the Pythagorean Theorem.

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[2] Scaffolding in a task provides the student with an entry point into a pathway for solving a problem. In unscaffolded tasks, the student determines his/her own pathway and process. Both scaffolded and unscaffolded tasks will be included in reasoning and modeling items.

Assessable Content for Sub-Claim D (Modeling Applications)

Sub-Claim D: Modeling Applications
Solve multi-step contextual word problems with degree of difficulty appropriate to Grade 8, requiring application of knowledge and skills articulated in Sub-claim A[3]. Tasks may have scaffolding.[2]
Solve multi-step contextual problems with degree of difficulty appropriate to grade 8, requiring application of knowledge and skills articulated in 7.RP.A, 7.NS.A.3, 7.EE, 7.G, and 7.SP.B. Tasks may have scaffolding.[2]
Micro-models: Autonomously apply a technique from pure mathematics to a real-world situation in which the technique yields valuable results even though it is obviously not applicable in a strict mathematical sense (e.g., profitably applying proportional relationships to a phenomenon that is obviously nonlinear or statistical in nature) requiring knowledge and skills articulated in Sub-claim A[3]. Tasks may have scaffolding.[2]
Reasoned estimates: Use reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity requiring knowledge and skills articulated in Sub-claim A[3]. Tasks may have scaffolding.[2]

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[3] Standards 8.EE.C.7a, 8.G.A.5 and 8.G.B.6 are not assessable in Modeling.