

Grade 8 Mathematics *Standards of Learning* - 2023 Overview of Revisions

This overview includes a summary of the content embedded in five content strands.

Number and Number Sense: *There are multiple representations of numbers and relationships among numbers that provide meaning and structure and allow for sense-making.*

- Compare and order real numbers, and determine the relationships between real numbers
- Investigate and describe the relationship between the subsets of the real number system

Computation and Estimation: *Estimation and the operations of addition, subtraction, multiplication, and division, allow us to model, represent, and solve different types of problems with rational numbers.*

- Estimate and apply proportional reasoning and computational procedures to solve contextual problems

Measurement and Geometry: *Analyzing and describing geometric objects, the relationships and structures among them, or the space that they occupy can be used to classify, quantify, measure, or count one or more attributes.*

- Use the relationships among pairs of angles that are vertical angles, adjacent angles, supplementary angles, and complementary angles to determine the measure of unknown angles
- Investigate and determine the surface area of square-based pyramids and the volume of cones and square-based pyramids
- Apply translations and reflections of polygons in the coordinate plane
- Apply the Pythagorean Theorem to solve problems involving right triangles
- Solve area and perimeter problems involving composite plane figures

Probability and Statistics: *The world can be investigated through posing questions and collecting, representing, analyzing, and interpreting data to describe and predict events and real-world phenomena.*

- Use statistical investigation to determine the probability of independent and dependent events
- Apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on boxplots and scatterplots

Patterns, Functions, and Algebra: *Proportional relationships can be described, and generalizations can be made using patterns, relations, and functions. Algebraic Equations and Inequalities can be used to represent and solve real world problems.*

- Represent, simplify, and generate equivalent algebraic expressions in one variable
- Determine whether a given relation is a function and determine the domain and range of a function
- Represent and solve problems using linear functions and analyze their key characteristics
- Create and solve multistep linear equations in one variable
- Create and solve multistep linear inequalities in one variable

Comparison of Grade 8 Mathematics *Standards of Learning* – 2016 to 2023

2016 <i>Standards of Learning</i> Essential Knowledge and Skills (EKS) Number and Number Sense	2023 <i>Standards of Learning</i> Knowledge and Skills (KS) Number and Number Sense (NS)
<p>8.1 The student will compare and order real numbers.</p> <ul style="list-style-type: none"> ● Compare and order no more than five real numbers expressed as integers, fractions (proper or improper), decimals, mixed numbers, percents, numbers written in scientific notation, radicals, and π. Radicals may include both positive and negative square roots of values from 0 to 400. Ordering may be in ascending or descending order. ● Use rational approximations (to the nearest hundredth) of irrational numbers to compare and order, locating values on a number line. Radicals may include both positive and negative square roots of values from 0 to 400 yielding an irrational number. 	<p>8.NS.1 The student will compare and order real numbers and determine the relationships between real numbers.</p> <ol style="list-style-type: none"> a) Estimate and identify the two consecutive natural numbers between which the positive square root of a given number lies and justify which natural number is the better approximation. Numbers are limited to natural numbers from 1 to 400. b) Use rational approximations (to the nearest hundredth) of irrational numbers to compare, order, and locate values on a number line. Radicals may include both positive and negative square roots of values from 0 to 400 yielding an irrational number. c) Use multiple strategies (e.g., benchmarks, number line, equivalency) to compare and order no more than five real numbers expressed as integers, fractions (proper or improper), decimals, mixed numbers, percents, numbers written in scientific notation, radicals, and π. Radicals may include both positive and negative square roots of values from 0 to 400. Ordering may be in ascending or descending order. Justify solutions orally, in writing or with a model.

<p align="center">2016 Standards of Learning Essential Knowledge and Skills (EKS) Number and Number Sense</p>	<p align="center">2023 Standards of Learning Knowledge and Skills (KS) Number and Number Sense (NS)</p>
<p>8.2 The student will describe the relationship between the subsets of the real number system.</p> <ul style="list-style-type: none"> ● Describe and illustrate the relationships among the subsets of the real number system by using representations (graphic organizers, number lines, etc.). Subsets include rational numbers, irrational numbers, integers, whole numbers, and natural numbers. ● Classify a given number as a member of a particular subset or subsets of the real number system, and explain why. ● Describe each subset of the set of real numbers and include examples and non-examples. ● Recognize that the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational. 	<p>8.NS.2 The student will investigate and describe the relationship between the subsets of the real number system.</p> <ul style="list-style-type: none"> a) Describe and illustrate the relationships among the subsets of the real number system by using representations (e.g., graphic organizers, number lines). Subsets include rational numbers, irrational numbers, integers, whole numbers, and natural numbers. b) Classify and explain why a given number is a member of a particular subset or subsets of the real number system. c) Describe each subset of the set of real numbers and include examples and non-examples.
<p>8.3 The student will</p> <p>a) estimate and determine the two consecutive integers between which a square root lies; and</p> <p>b) determine both the positive and negative square roots of a given perfect square.</p> <ul style="list-style-type: none"> ● Estimate and identify the two consecutive integers between which the positive or negative square root of a given number lies. Numbers are limited to natural numbers from 1 to 400. (a) ● Determine the positive or negative square root of a given perfect square from 1 to 400. (b) 	<p>[Included in 8.NS.1 and Grade 7]</p>

<p align="center">2016 Standards of Learning Essential Knowledge and Skills (EKS) Computation and Estimation</p>	<p align="center">2023 Standards of Learning Knowledge and Skills (KS) Computation and Estimation (CE)</p>
<p>8.4 The student will solve practical problems involving consumer applications.</p> <ul style="list-style-type: none"> ● Solve practical problems involving consumer applications by using proportional reasoning and computation procedures for rational numbers. ● Reconcile an account balance given a statement with five or fewer transactions. ● Compute a discount or markup and the resulting sale price for one discount or markup. ● Compute the sales tax or tip and resulting total. ● Compute the simple interest and new balance earned in an investment or on a loan given the principal amount, interest rate, and time period in years. ● Compute the percent increase or decrease found in a practical situation. 	<p>8.CE.1 The student will estimate and apply proportional reasoning and computational procedures to solve contextual problems.</p> <ol style="list-style-type: none"> a) Estimate and solve contextual problems that require the computation of one discount or markup and the resulting sale price. b) Estimate and solve contextual problems that require the computation of the sales tax, tip and resulting total. c) Estimate and solve contextual problems that require the computation of the percent increase or decrease.

<p align="center">2016 Standards of Learning Essential Knowledge and Skills (EKS) Measurement and Geometry</p>	<p align="center">2023 Standards of Learning Knowledge and Skills (KS) Measurement and Geometry (MG)</p>
<p>8.5 The student will use the relationships among pairs of angles that are vertical angles, adjacent angles, supplementary angles, and complementary angles to determine the measure of unknown angles.</p>	<p>8.MG.1 The student will use the relationships among pairs of angles that are vertical angles, adjacent angles, supplementary angles, and complementary angles to determine the measure of unknown angles.</p>

<p style="text-align: center;">2016 Standards of Learning Essential Knowledge and Skills (EKS) Measurement and Geometry</p>	<p style="text-align: center;">2023 Standards of Learning Knowledge and Skills (KS) Measurement and Geometry (MG)</p>
<ul style="list-style-type: none"> ● Identify and describe the relationship between pairs of angles that are vertical, adjacent, supplementary, and complementary. ● Use the relationships among supplementary, complementary, vertical, and adjacent angles to solve problems, including practical problems, involving the measure of unknown angles. 	<ul style="list-style-type: none"> a) Identify and describe the relationship between pairs of angles that are vertical, adjacent, supplementary, and complementary. b) Use the relationships among supplementary, complementary, vertical, and adjacent angles to solve problems, including those in context, involving the measure of unknown angles.
<p>8.6 The student will</p> <p>a) solve problems, including practical problems, involving volume and surface area of cones and square-based pyramids;</p> <ul style="list-style-type: none"> ● Distinguish between situations that are applications of surface area and those that are applications of volume. (a) ● Determine the surface area of cones and square-based pyramids by using concrete objects, nets, diagrams, and formulas. (a) ● Determine the volume of cones and square-based pyramids, using concrete objects, diagrams, and formulas. (a) ● Solve practical problems involving volume and surface area of cones and square-based pyramids. (a) 	<p>8.MG.2 The student will investigate and determine the surface area of square-based pyramids and the volume of cones and square-based pyramids.</p> <ul style="list-style-type: none"> a) Determine the surface area of square-based pyramids by using concrete objects, nets, diagrams, and formulas. b) Determine the volume of cones and square-based pyramids, using concrete objects, diagrams, and formulas. c) Examine and explain the relationship between the volume of cones and cylinders, and the volume of rectangular prisms and square based pyramids. d) Solve problems in context involving volume of cones and square-based pyramids and the surface area of square-based pyramids.
<p>8.6 The student will</p> <p>b) describe how changing one measured attribute of a rectangular prism affects the volume and surface area.</p> <ul style="list-style-type: none"> ● Describe how the volume of a rectangular prism is affected when one measured attribute is multiplied by a factor of $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, 2, 3, or 4. (b) 	<p>[Moved to Grade 7]</p>

<p style="text-align: center;">2016 Standards of Learning Essential Knowledge and Skills (EKS) Measurement and Geometry</p>	<p style="text-align: center;">2023 Standards of Learning Knowledge and Skills (KS) Measurement and Geometry (MG)</p>
<ul style="list-style-type: none"> ● Describe how the surface area of a rectangular prism is affected when one measured attribute is multiplied by a factor of $\frac{1}{2}$ or 2. (b) 	
<p>8.7 The student will</p> <p>a) given a polygon, apply transformations, to include translations, reflections, and dilations, in the coordinate plane; and</p> <p>b) identify practical applications of transformations.</p> <ul style="list-style-type: none"> ● Given a preimage in the coordinate plane, identify the coordinate of the image of a polygon that has been translated vertically, horizontally, or a combination of both. (a) ● Given a preimage in the coordinate plane, identify the coordinates of the image of a polygon that has been reflected over the x- or y-axis. (a) ● Given a preimage in the coordinate plane, identify the coordinates of the image of a right triangle or a rectangle that has been dilated. Scale factors are limited to $\frac{1}{4}$, $\frac{1}{2}$, 2, 3, or 4. The center of the dilation will be the origin. (a) ● Given a preimage in the coordinate plane, identify the coordinates of the image of a polygon that has been translated and reflected over the x- or y-axis, or reflected over the x- or y-axis and then translated. (a) ● Sketch the image of a polygon that has been translated vertically, horizontally, or a combination of both. (a) ● Sketch the image of a polygon that has been reflected over the x- or y-axis. (a) 	<p>8.MG.3 The student will apply translations and reflections to polygons in the coordinate plane.</p> <ul style="list-style-type: none"> a) Given a preimage in the coordinate plane, identify the coordinates of the image of a polygon that has been translated vertically, horizontally, or a combination of both. b) Given a preimage in the coordinate plane, identify the coordinates of the image of a polygon that has been reflected over the x- or y-axis c) Given a preimage in the coordinate plane, identify the coordinates of the image of a polygon that has been translated and reflected over the x- or y-axis or reflected over the x- or y-axis and then translated. d) Sketch the image of a polygon that has been translated vertically, horizontally, or a combination of both. e) Sketch the image of a polygon that has been reflected over the x- or y-axis. f) Sketch the image of a polygon that has been translated and reflected over the x- or y-axis, or reflected over the x- or y-axis and then translated. g) Identify and describe transformations in context (e.g., tiling, fabric, wallpaper designs, art).

<p style="text-align: center;">2016 Standards of Learning Essential Knowledge and Skills (EKS) Measurement and Geometry</p>	<p style="text-align: center;">2023 Standards of Learning Knowledge and Skills (KS) Measurement and Geometry (MG)</p>
<ul style="list-style-type: none"> ● Sketch the image of a dilation of a right triangle or a rectangle limited to a scale factor of $\frac{1}{4}$, $\frac{1}{2}$, 2, 3, or 4. The center of the dilation will be the origin. (a) ● Sketch the image of a polygon that has been translated and reflected over the x- or y-axis, or reflected over the x- or y-axis and then translated. (a) ● Identify the type of translation in a given example. (a, b) ● Identify practical applications of transformations including, but not limited to, tiling, fabric, wallpaper designs, art, and scale drawings. (b) 	
<p>8.8 The student will construct a three-dimensional model, given the top or bottom, side, and front views.</p> <ul style="list-style-type: none"> ● Construct three-dimensional models, given the top or bottom, side, and front views. ● Identify three-dimensional models given a two-dimensional perspective. ● Identify the two-dimensional perspective from the top or bottom, side, and front view, given a three-dimensional model. 	<p>[Deleted]</p>
<p>8.9 The student will</p> <p>a) verify the Pythagorean Theorem; and</p> <p>b) apply the Pythagorean Theorem.</p> <ul style="list-style-type: none"> ● Verify the Pythagorean Theorem, using diagrams, concrete materials, and measurement. (a) ● Determine whether a triangle is a right triangle given the measures of its three sides. (b) 	<p>8.MG.4 The student will apply the Pythagorean Theorem to solve problems involving right triangles, including those in context.</p> <ul style="list-style-type: none"> a) Verify the Pythagorean Theorem using diagrams, concrete materials, and measurement. b) Determine whether a triangle is a right triangle given the measures of its three sides.

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<ul style="list-style-type: none"> ● Determine the measure of a side of a right triangle, given the measures of the other two sides. (b) ● Solve practical problems involving right triangles by using the Pythagorean Theorem. (b) 	<ul style="list-style-type: none"> c) Identify the parts of a right triangle (the hypotenuse and the legs) given figures in various orientations. d) Determine the measure of a side of a right triangle, given the measures of the other two sides. e) Apply the Pythagorean Theorem, and its converse, to solve problems involving right triangles in context.
<p>8.10 The student will solve area and perimeter problems, including practical problems, involving composite plane figures.</p> <ul style="list-style-type: none"> ● Subdivide a plane figure into triangles, rectangles, squares, trapezoids, parallelograms, and semicircles. Determine the area of subdivisions and combine to determine the area of the composite plane figure. ● Subdivide a plane figure into triangles, rectangles, squares, trapezoids, parallelograms, and semicircles. Use the attributes of the subdivisions to determine the perimeter of the composite plane figure. ● Apply perimeter, circumference, and area formulas to solve practical problems involving composite plane figures. 	<p>8.MG.5 The student will solve area and perimeter problems involving composite plane figures, including those in context.</p> <ul style="list-style-type: none"> a) Subdivide a plane figure into triangles, rectangles, squares, trapezoids, parallelograms, circles, and semicircles. Determine the area of subdivisions and combine to determine the area of the composite plane figure. b) Subdivide a plane figure into triangles, rectangles, squares, trapezoids, parallelograms, and semicircles. Use the attributes of the subdivisions to determine the perimeter of the composite plane figure. c) Apply perimeter, circumference, and area formulas to solve contextual problems involving composite plane figures.

<p style="text-align: center;">2016 Standards of Learning Essential Knowledge and Skills (EKS) Probability and Statistics</p>	<p style="text-align: center;">2023 Standards of Learning Knowledge and Skills (KS) Probability and Statistics (PS)</p>
<p>8.11 The student will</p> <p>a) compare and contrast the probability of independent and dependent events; and</p> <p>b) determine probabilities for independent and dependent events.</p> <ul style="list-style-type: none"> ● Determine whether two events are independent or dependent. (a) ● Compare and contrast the probability of independent and dependent events. (a) ● Determine the probability of two independent events. (b) ● Determine the probability of two dependent events. (b) 	<p>8.PS.1 The student will use statistical investigation to determine the probability of independent and dependent events, including those in context.</p> <ul style="list-style-type: none"> a) Determine whether two events are independent or dependent and explain how replacement impacts the probability. b) Compare and contrast the probability of independent and dependent events. c) Determine the probability of two independent events. d) Determine the probability of two dependent events.
<p>8.12 The student will</p> <p>a) represent numerical data in boxplots;</p> <p>b) make observations and inferences about data represented in boxplots; and</p> <p>c) compare and analyze two data sets using boxplots.</p> <ul style="list-style-type: none"> ● Collect and display a numeric data set of no more than 20 items, using boxplots. (a) ● Make observations and inferences about data represented in a boxplot. (b) ● Given a data set represented in a boxplot, identify, and describe the lower extreme (minimum), upper extreme (maximum), median, upper quartile, lower quartile, range, and interquartile range. (b) ● Compare and analyze two data sets represented in boxplots. (c) 	<p>8.PS.2 The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on boxplots.</p> <ul style="list-style-type: none"> a) Formulate questions that require the collection or acquisition of data with a focus on boxplots. b) Determine the data needed to answer a formulated question and collect the data (or acquire existing data) using various methods (e.g., observations, measurement, surveys, experiments). c) Determine how statistical bias might affect whether the data collected from the sample is representative of the larger population. d) Organize and represent a numeric data set of no more than 20 items, using boxplots, with and without the use of technology. e) Identify and describe the lower extreme (minimum), upper extreme (maximum), median, upper quartile, lower quartile, range, and interquartile range given a data set, represented by a boxplot.

<p align="center">2016 Standards of Learning Essential Knowledge and Skills (EKS) Probability and Statistics</p>	<p align="center">2023 Standards of Learning Knowledge and Skills (KS) Probability and Statistics (PS)</p>
	<ul style="list-style-type: none"> f) Describe how the presence of an extreme data point (outlier) affects the shape and spread of the data distribution of a boxplot. g) Analyze data represented in a boxplot by making observations and drawing conclusions. h) Compare and analyze two data sets represented in boxplots. i) Given a contextual situation, justify which graphical representation (e.g., pictographs, bar graphs, line graphs, line plots/dot plots, stem-and-leaf plots, circle graphs, histograms, and boxplots) best represents the data. j) Identify components of graphical displays that can be misleading.
<p>8.13 The student will</p> <ul style="list-style-type: none"> a) represent data in scatterplots; b) make observations about data represented in scatterplots; and c) use a drawing to estimate the line of best fit for data represented in a scatterplot. <ul style="list-style-type: none"> ● Collect, organize, and represent a data set of no more than 20 items using scatterplots. (a) ● Make observations about a set of data points in a scatterplot as having a positive linear relationship, a negative linear relationship, or no relationship. (b) ● Estimate the line of best fit with a drawing for data represented in a scatterplot. (c) 	<p>8.PS.3 The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on scatterplots.</p> <ul style="list-style-type: none"> a) Formulate questions that require the collection or acquisition of data with a focus on scatterplots. b) Determine the data needed to answer a formulated question and collect the data (or acquire existing data) of no more than 20 items using various methods (e.g., observations, measurement, surveys, experiments). c) Organize and represent numeric bivariate data using scatterplots with and without the use of technology. d) Make observations about a set of data points in a scatterplot as having a positive linear relationship, a negative linear relationship, or no relationship e) Analyze and justify the relationship of the quantitative bivariate data represented in scatterplots.

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	<p>f) Sketch the line of best fit for data represented in a scatterplot.</p>

<p align="center">2016 Standards of Learning Essential Knowledge and Skills (EKS) Patterns, Functions, and Algebra</p>	<p align="center">2023 Standards of Learning Knowledge and Skills (KS) Patterns, Functions, and Algebra (PFA)</p>
<p>8.14 The student will a) evaluate an algebraic expression for given replacement values of the variables;</p> <ul style="list-style-type: none"> Use the order of operations and apply the properties of real numbers to evaluate algebraic expressions for the given replacement values of the variables. Exponents are limited to whole numbers and bases are limited to integers. Square roots are limited to perfect squares. Limit the number of replacements to no more than three per expression. (a) 	<p>[Included in Grade 7]</p>
<p>8.14 The student will b) simplify algebraic expressions in one variable.</p> <ul style="list-style-type: none"> Represent algebraic expressions using concrete materials and pictorial representations. Concrete materials may include colored chips or algebra tiles. (a) Simplify algebraic expressions in one variable. Expressions may need to be expanded (using the distributive property) or require combining like terms to simplify. Expressions will include only linear and numeric terms. Coefficients and numeric terms may be rational. (b) 	<p>8.PFA.1 The student will represent, simplify, and generate equivalent algebraic expressions in one variable.</p> <ul style="list-style-type: none"> Represent algebraic expressions using concrete manipulatives or pictorial representations (e.g., colored chips, algebra tiles), including expressions that apply the distributive property. Simplify and generate equivalent algebraic expressions in one variable by applying the order of operations and properties of real numbers. Expressions may need to be expanded (using the distributive property) or require combining like terms to

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	<p>simplify. Expressions will include only linear and numeric terms. Coefficients and numeric terms may be rational.</p>
<p>8.15 The student will a) determine whether a given relation is a function; and b) determine the domain and range of a function.</p> <ul style="list-style-type: none"> ● Determine whether a relation, represented by a set of ordered pairs, a table, or a graph of discrete points is a function. Sets are limited to no more than 10 ordered pairs. (a) ● Identify the domain and range of a function represented as a set of ordered pairs, a table, or a graph of discrete points. (b) 	<p>8.PFA.2 The student will determine whether a given relation is a function and determine the domain and range of a function.</p> <ul style="list-style-type: none"> a) Determine whether a relation, represented by a set of ordered pairs, a table, or a graph of discrete points is a function. Sets are limited to no more than 10 ordered pairs. b) Identify the domain and range of a function represented as a set of ordered pairs, a table, or a graph of discrete points.
<p>8.16 The student will a) recognize and describe the graph of a linear function with a slope that is positive, negative, or zero;</p> <ul style="list-style-type: none"> ● Recognize and describe a line with a slope that is positive, negative, or zero (0). (a) 	<p>[Moved to Grade 7]</p>
<p>8.16 The student will b) identify the slope and y-intercept of a linear function given a table of values, a graph, or an equation in $y = mx + b$ form; c) determine the independent and dependent variable, given a practical situation modeled by a linear function; d) graph a linear function given the equation in $y = mx + b$ form; and</p>	<p>8.PFA.3 The student will represent and solve problems, including those in context, by using linear functions and analyzing their key characteristics (the value of the y-intercept (b) and the coordinates of the ordered pairs in graphs will be limited to integers).</p> <ul style="list-style-type: none"> a) Determine how adding a constant (b) to the equation of a proportional relationship $y = mx$ will translate the line on a graph.

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<p>e) make connections between and among representations of a linear function using verbal descriptions, tables, equations, and graphs.</p> <ul style="list-style-type: none"> ● Given a table of values for a linear function, identify the slope and y-intercept. The table will include the coordinate of the y-intercept. (b) ● Given a linear function in the form $y = mx + b$, identify the slope and y-intercept. (b) ● Given the graph of a linear function, identify the slope and y-intercept. The value of the y-intercept will be limited to integers. The coordinates of the ordered pairs shown in the graph will be limited to integers. (b) ● Identify the dependent and independent variable, given a practical situation modeled by a linear function. (c) ● Given the equation of a linear function in the form $y = mx + b$, graph the function. The value of the y-intercept will be limited to integers. (d) ● Write the equation of a linear function in the form $y = mx + b$ given values for the slope, m, and the y-intercept or given a practical situation in which the slope, m, and y-intercept are described verbally. (e) ● Make connections between and among representations of a linear function using verbal descriptions, tables, equations, and graphs. (e). 	<ul style="list-style-type: none"> b) Describe key characteristics of linear functions including slope (m), y-intercept (b), and independent and dependent variables. c) Graph a linear function given a table, equation, or a situation in context. d) Create a table of values for a linear function given a graph, equation in the form of $y = mx + b$, or context. e) Write an equation of a linear function in the form $y = mx + b$, given a graph, table, or a situation in context. f) Create a context for a linear function given a graph, table, or equation in the form $y = mx + b$.
<p>8.17 The student will solve multistep linear equations in one variable with the variable on one or both sides of the equation,</p>	<p>8.PFA.4 The student will write and solve multistep linear equations in one variable, including problems in context that require the solution of a multistep linear equation in one variable.</p>

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<p>including practical problems that require the solution of a multistep linear equation in one variable.</p> <ul style="list-style-type: none"> ● Represent and solve multistep linear equations in one variable with the variable on one or both sides of the equation (up to four steps) using a variety of concrete materials and pictorial representations. ● Apply properties of real numbers and properties of equality to solve multistep linear equations in one variable (up to four steps). Coefficients and numeric terms will be rational. Equations may contain expressions that need to be expanded (using the distributive property) or require collecting like terms to solve. ● Write verbal expressions and sentences as algebraic expressions and equations. ● Write algebraic expressions and equations as verbal expressions and sentences. ● Solve practical problems that require the solution of a multistep linear equation. ● Confirm algebraic solutions to linear equations in one variable. 	<ul style="list-style-type: none"> a) Represent and solve multistep linear equations in one variable with the variable on one or both sides of the equation (up to four steps) using a variety of concrete materials and pictorial representations. b) Apply properties of real numbers and properties of equality to solve multistep linear equations in one variable (up to four steps). Coefficients and numeric terms will be rational. Equations may contain expressions that need to be expanded (using the distributive property) or require combining like terms to solve. c) Write a multistep linear equation in one variable to represent a verbal situation, including those in context. d) Create a verbal situation in context given a multistep linear equation in one variable. e) Solve problems in context that require the solution of a multistep linear equation. f) Interpret algebraic solutions in context to linear equations in one variable. g) Confirm algebraic solutions to linear equations in one variable.
<p>8.18 The student will solve multistep linear inequalities in one variable with the variable on one or both sides of the inequality symbol, including practical problems, and graph the solution on a number line.</p> <ul style="list-style-type: none"> ● Apply properties of real numbers and properties of inequality to solve multistep linear inequalities (up to four steps) in one variable with the variable on one or both sides of the inequality. Coefficients and numeric terms will be rational. Inequalities may 	<p>8.PFA.5 The student will create and solve multistep linear inequalities in one variable, including problems in context that require the solution of a multistep linear inequality in one variable.</p> <ul style="list-style-type: none"> a) Apply properties of real numbers and properties of inequality to solve multistep linear inequalities (up to four steps) in one variable with the variable on one or both sides of the inequality. Coefficients and numeric terms will be rational. Inequalities

<p style="text-align: center;">2016 <i>Standards of Learning</i> Essential Knowledge and Skills (EKS) Patterns, Functions, and Algebra</p>	<p style="text-align: center;">2023 <i>Standards of Learning</i> Knowledge and Skills (KS) Patterns, Functions, and Algebra (PFA)</p>
<p>contain expressions that need to be expanded (using the distributive property) or require collecting like terms to solve.</p> <ul style="list-style-type: none"> ● Graph solutions to multistep linear inequalities on a number line. ● Write verbal expressions and sentences as algebraic expressions and inequalities. ● Write algebraic expressions and inequalities as verbal expressions and sentences. ● Solve practical problems that require the solution of a multistep linear inequality in one variable. ● Identify a numerical value(s) that is part of the solution set of as given inequality. 	<p>may contain expressions that need to be expanded (using the distributive property) or require collecting like terms to solve.</p> <ul style="list-style-type: none"> b) Represent solutions to inequalities algebraically and graphically using a number line. c) Write multistep linear inequalities in one variable to represent a verbal situation, including those in context. d) Create a verbal situation in context given a multistep linear inequality in one variable. e) Solve problems in context that require the solution of a multistep linear inequality in one variable. f) Identify a numerical value(s) that is part of the solution set of as given inequality. g) Interpret algebraic solutions in context to linear inequalities in one variable.

2023 Grade 8 Mathematics SOL – Summary of Changes

Grade 8 (2016 SOL to 2023 SOL Numbering)	Parameter Changes/Clarifications (2023 SOL)
<ul style="list-style-type: none"> ● 8.1 → 8.NS.1 ● 8.2 → 8.NS.2 ● 8.3a → 8.NS.1 ● 8.3b → [Included in Grade 7] ● 8.4 → 8.CE.1 ● 8.5 → 8.MG.1 ● 8.6a → 8.MG.2 ● 8.6b → [Moved to Grade 7] ● 8.7a-b → 8.MG.3 ● 8.8 → [Deleted] ● 8.9a-b → 8.MG.4 ● 8.10 → 8.MG.5 ● 8.11a-b → 8.PS.1 ● 8.12a-c → 8.PS.2 ● 8.13a-c → 8.PS.3 ● 8.14a → [Included in Grade 7] ● 8.14b → 8.PFA.1 ● 8.15a-b → 8.PFA.2 ● 8.16a → [Moved to Grade 7] ● 8.16b-e → 8.PFA.3 ● 8.17 → 8.PFA.4 ● 8.18 → 8.PFA.5 	<ul style="list-style-type: none"> ● 8.NS.1c - Use multiple strategies to compare and order real numbers ● 8.CE.1 - Include estimating with contextual problem solving ● 8.MG.2c - Examine and explain the relationship between the volume of related solids (cone/cylinder and square-based pyramid/rectangular prism) ● 8.MG.4c - Identify the parts of a right triangle (the hypotenuse and the legs) given figures in various positions ● 8.PS.1a - Explain how replacement impacts the probability of independent and dependent events ● 8.PS.2d,i - Include the use of technology to represent boxplots; justify which graphical representation best represents the data ● 8.PS.3c - Include use of technology to represent scatterplots ● 8.PFA.1a - Model the distributive property ● 8.PFA.3a,b - Determine how adding a constant (b) to the equation of a proportional relationship $y = mx$ will translate the line on a graph; Describe the key characteristics of linear functions (slope, y-intercept, independent and dependent variables) ● 8.PFA.4c,d - Create a verbal situation in context given multistep linear equation in one variable and write a multistep equation to represent a problem in context ● 8.PFA.5d,e - Create a verbal situation in context given a multistep linear inequality in one variable and write a multistep inequality to represent a problem in context

Deletions from Grade 8 (2016 SOL)	Additions (2023 SOL)
<ul style="list-style-type: none"> ● 8.2 [EKS]- Sum and products of rational and irrational numbers ● 8.3b – Determine positive or negative square roots of perfect squares [Included in Grade 7] ● 8.4 [EKS] - Reconcile account balance [Included in Economics and Personal Finance] ● 8.4 [EKS] - Compute simple interest [Included in Economics and Personal finance] ● 8.6a – Solve problems involving the surface area of a cone [Included in Geometry] ● 8.6b [EKS] – Describe how changing one attribute of a rectangular prism affects volume and surface area [Moved to Grade 7] ● 8.7a- Give a polygon, apply a dilation, in the coordinate plane [Moved to Grade 7] ● 8.8 - Constructing 3-D models (front, side, back view) ● 8.14a - Evaluating algebraic expressions given replacement values of the variables [Included in Grade 7] ● 8.16a - Recognize and describe a line with a slope that is positive, negative, or zero (0) [Moved to Grade 7] 	<ul style="list-style-type: none"> ● 8.PS.2 [KS] - Additional data analysis knowledge and skills representing the data cycle have been included with a focus on boxplots ● 8.PS.3 [KS] - Additional data analysis knowledge and skills representing the data cycle have been included, with a focus on scatterplots

KEY: NS = Number and Number Sense; CE = Computation and Estimation; MG = Measurement and Geometry; PS = Probability and Statistics; PFA = Patterns, Functions, and Algebra; EKS = Essential Knowledge and Skills (2016); KS = Knowledge and Skills (2023); US = Understanding the Standard