Grade Six Mathematics (#1205010) 2022 - And Beyond

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Course Standards

Name	Description
MA.6.AR.1.1:	Given a mathematical or real-world context, translate written descriptions into algebraic expressions and translate algebraic expressions into written descriptions.
MA.6.AR.1.2:	Translate a real-world written description into an algebraic inequality in the form of $x > a, x < a, x \geq a$ or $x \leq a$. Represent the inequality on a number line. **Clarifications:** *Clarification 1:* Variables may be on the left or right side of the inequality symbol.
MA.6.AR.1.3:	Evaluate algebraic expressions using substitution and order of operations. **Clarifications:** *Clarification 1:* Within this benchmark, the expectation is to perform all operations with integers. *Clarification 2:* Refer to Properties of Operations, Equality and Inequality (Appendix D).
MA.6.AR.1.4:	Apply the properties of operations to generate equivalent algebraic expressions with integer coefficients. **Clarifications:** *Clarification 1:* Properties include associative, commutative and distributive. *Clarification 2:* Refer to Properties of Operations, Equality and Inequality (Appendix D).
MA.6.AR.2.1:	Given an equation or inequality and a specified set of integer values, determine which values make the equation or inequality true or false. **Clarifications:** *Clarification 1:* Problems include the variable in multiple terms or on either side of the equal sign or inequality symbol.
MA.6.AR.2.2:	Write and solve one-step equations in one variable within a mathematical or real-world context using addition and subtraction, where all terms and solutions are integers. **Clarifications:** *Clarification 1:* Instruction includes using manipulatives, drawings, number lines and inverse operations. *Clarification 2:* Instruction includes equations in the forms x+p=q and p+x=q, where x,p and q are any integer. *Clarification 3:* Problems include equations where the variable may be on either side of the equal sign.
MA.6.AR.2.3:	Write and solve one-step equations in one variable within a mathematical or real-world context using multiplication and division, where all terms and solutions are integers. **Clarifications:** *Clarification 1:* Instruction includes using manipulatives, drawings, number lines and inverse operations. *Clarification 2:* Instruction includes equations in the forms $\frac{x}{p} = q$, where p≠0, and px=q. *Clarification 3:* Problems include equations where the variable may be on either side of the equal sign.
MA.6.AR.2.4:	Determine the unknown decimal or fraction in an equation involving any of the four operations, relating three numbers, with the unknown in any position. **Clarifications:** *Clarification 1:* Instruction focuses on using algebraic reasoning, drawings, and mental math to determine unknowns. *Clarification 2:* Problems include the unknown and different operations on either side of the equal sign. All terms and solutions are limited to positive rational numbers.
MA.6.AR.3.1:	Given a real-world context, write and interpret ratios to show the relative sizes of two quantities using appropriate notation: $\frac{a}{b}$, a to b, or a:b where b ≠ 0. **Clarifications:** *Clarification 1:* Instruction focuses on the understanding that a ratio can be described as a comparison of two quantities in either the same or different units. *Clarification 2:* Instruction includes using manipulatives, drawings, models and words to interpret part-to-part ratios and part-to-whole ratios. *Clarification 3:* The values of a and b are limited to whole numbers.
MA.6.AR.3.2:	Given a real-world context, determine a rate for a ratio of quantities with different units. Calculate and interpret the corresponding unit rate. **Clarifications:** *Clarification 1:* Instruction includes using manipulatives, drawings, models and words and making connections between ratios, rates and unit rates. *Clarification 2:* Problems will not include conversions between customary and metric systems.

MA.6.AR.3.3:	Extend previous understanding of fractions and numerical patterns to generate or complete a two- or three-column table to display equivalent part-to-part ratios and part-to-part-to-whole ratios. **Clarifications:** *Clarification 1:* Instruction includes using two-column tables (e.g., a relationship between two variables) and three-column tables (e.g., part-to-part-to-whole relationship) to generate conversion charts and mixture charts.
MA.6.AR.3.4:	Apply ratio relationships to solve mathematical and real-world problems involving percentages using the relationship between two quantities. **Clarifications:** *Clarification 1:* Instruction includes the comparison of $\frac{part}{whole}$ to $\frac{percent}{100}$ in order to determine the percent, the part or the whole.
MA.6.AR.3.5:	Solve mathematical and real-world problems involving ratios, rates and unit rates, including comparisons, mixtures, ratios of lengths and conversions within the same measurement system. **Clarifications:** *Clarification 1:* Instruction includes the use of tables, tape diagrams and number lines.
MA.6.DP.1.1:	Recognize and formulate a statistical question that would generate numerical data.
MA.6.DP.1.2:	Given a numerical data set within a real-world context, find and interpret mean, median, mode and range. **Clarifications:** *Clarification 1:* Numerical data is limited to positive rational numbers.
MA.6.DP.1.3:	Given a box plot within a real-world context, determine the minimum, the lower quartile, the median, the upper quartile and the maximum. Use this summary of the data to describe the spread and distribution of the data. **Clarifications:** *Clarification 1:* Instruction includes describing range, interquartile range, halves and quarters of the data.
MA.6.DP.1.4:	Given a histogram or line plot within a real-world context, qualitatively describe and interpret the spread and distribution of the data, including any symmetry, skewness, gaps, clusters, outliers and the range. **Clarifications:** *Clarification 1:* Refer to K-12 Mathematics Glossary (Appendix C).
MA.6.DP.1.5:	Create box plots and histograms to represent sets of numerical data within real-world contexts. **Clarifications:** *Clarification 1:* Instruction includes collecting data and discussing ways to collect truthful data to construct graphical representations. *Clarification 2:* Within this benchmark, it is the expectation to use appropriate titles, labels, scales and units when constructing graphical representations. *Clarification 3:* Numerical data is limited to positive rational numbers.
MA.6.DP.1.6:	Given a real-world scenario, determine and describe how changes in data values impact measures of center and variation. **Clarifications:** *Clarification 1:* Instruction includes choosing the measure of center or measure of variation depending on the scenario. *Clarification 2:* The measures of center are limited to mean and median. The measures of variation are limited to range and interquartile range. *Clarification 3:* Numerical data is limited to positive rational numbers.
MA.6.GR.1.1:	Extend previous understanding of the coordinate plane to plot rational number ordered pairs in all four quadrants and on both axes. Identify the x- or y-axis as the line of reflection when two ordered pairs have an opposite x- or y-coordinate.
MA.6.GR.1.2:	Find distances between ordered pairs, limited to the same x-coordinate or the same y-coordinate, represented on the coordinate plane.
MA.6.GR.1.3:	Solve mathematical and real-world problems by plotting points on a coordinate plane, including finding the perimeter or area of a rectangle. **Clarifications:** *Clarification 1:* Instruction includes finding distances between points, computing dimensions of a rectangle or determining a fourth vertex of a rectangle. *Clarification 2:* Problems involving rectangles are limited to cases where the sides are parallel to the axes.
MA.6.GR.2.1:	Derive a formula for the area of a right triangle using a rectangle. Apply a formula to find the area of a triangle. **Clarifications:** *Clarification 1:* Instruction focuses on the relationship between the area of a rectangle and the area of a right triangle. *Clarification 2:* Within this benchmark, the expectation is to know from memory a formula for the area of a triangle.
MA.6.GR.2.2:	Solve mathematical and real-world problems involving the area of quadrilaterals and composite figures by decomposing them into triangles or rectangles. **Clarifications:** *Clarification 1:* Problem types include finding area of composite shapes and determining missing dimensions. *Clarification 2:* Within this benchmark, the expectation is to know from memory a formula for the area of a rectangle and triangle. *Clarification 3:* Dimensions are limited to positive rational numbers.
MA.6.GR.2.3:	Solve mathematical and real-world problems involving the volume of right rectangular prisms with positive rational number edge lengths using a visual model and a formula. **Clarifications:** *Clarification 1:* Problem types include finding the volume or a missing dimension of a rectangular prism.
	Given a mathematical or real-world context, find the surface area of right rectangular prisms and right rectangular pyramids using the figure's net. **Clarifications:** *Clarification 1:* Instruction focuses on representing a right rectangular prism and right rectangular pyramid with its net and on the connection between the surface area of a figure and its net.

MA.6.GR.2.4:	*Clarification 2:* Within this benchmark, the expectation is to find the surface area when given a net or when given a three-dimensional figure. *Clarification 3:* Problems involving right rectangular pyramids are limited to cases where the heights of triangles are given. *Clarification 4:* Dimensions are limited to positive rational numbers.
MA.6.NSO.1.1:	Extend previous understanding of numbers to define rational numbers. Plot, order and compare rational numbers. **Clarifications:** *Clarification 1:* Within this benchmark, the expectation is to plot, order and compare positive and negative rational numbers when given in the same form and to plot, order and compare positive rational numbers when given in different forms (fraction, decimal, percentage). *Clarification 2:* Within this benchmark, the expectation is to use symbols (<, > or =).
MA.6.NSO.1.2:	Given a mathematical or real-world context, represent quantities that have opposite direction using rational numbers. Compare them on a number line and explain the meaning of zero within its context. **Clarifications:** *Clarification 1:* Instruction includes vertical and horizontal number lines, context referring to distances, temperatures and finances and using informal verbal comparisons, such as, lower, warmer or more in debt. *Clarification 2:* Within this benchmark, the expectation is to compare positive and negative rational numbers when given in the same form.
MA.6.NSO.1.3:	Given a mathematical or real-world context, interpret the absolute value of a number as the distance from zero on a number line. Find the absolute value of rational numbers. **Clarifications:** *Clarification 1:* Instruction includes the connection of absolute value to mirror images about zero and to opposites. *Clarification 2:* Instruction includes vertical and horizontal number lines and context referring to distances, temperature and finances.
MA.6.NSO.1.4:	Solve mathematical and real-world problems involving absolute value, including the comparison of absolute value. **Clarifications:** *Clarification 1:* Absolute value situations include distances, temperatures and finances. *Clarification 2:* Problems involving calculations with absolute value are limited to two or fewer operations. *Clarification 3:* Within this benchmark, the expectation is to use integers only.
MA.6.NSO.2.1:	Multiply and divide positive multi-digit numbers with decimals to the thousandths, including using a standard algorithm with procedural fluency. **Clarifications:** *Clarification 1:* Multi-digit decimals are limited to no more than 5 total digits.
MA.6.NSO.2.2:	Extend previous understanding of multiplication and division to compute products and quotients of positive fractions by positive fractions, including mixed numbers, with procedural fluency. **Clarifications:** *Clarification 1:* Instruction focuses on making connections between visual models, the relationship between multiplication and division, reciprocals and algorithms.
MA.6.NSO.2.3:	Solve multi-step real-world problems involving any of the four operations with positive multi-digit decimals or positive fractions, including mixed numbers. **Clarifications:** *Clarification 1:* Within this benchmark, it is not the expectation to include both decimals and fractions within a single problem.
MA.6.NSO.3.1:	Given a mathematical or real-world context, find the greatest common factor and least common multiple of two whole numbers. **Clarifications:** *Clarification 1:* Within this benchmark, expectations include finding greatest common factor within 1,000 and least common multiple with factors to 25.
MA.6.NSO.3.2:	Rewrite the sum of two composite whole numbers having a common factor, as a common factor multiplied by the sum of two whole numbers. **Clarifications:** *Clarification 1:* Instruction includes using the distributive property to generate equivalent expressions.
MA.6.NSO.3.3:	Evaluate positive rational numbers with natural number exponents. **Clarifications:** *Clarification 1:* Within this benchmark, expectations include using natural number exponents up to 5.
MA.6.NSO.3.4:	Express composite whole numbers as a product of prime factors with natural number exponents.
MA.6.NSO.3.5:	Rewrite positive rational numbers in different but equivalent forms including fractions, terminating decimals and percentages. **Clarifications:** *Clarification 1:* Rational numbers include decimal equivalence up to the thousandths place.
MA.6.NSO.4.1:	Apply and extend previous understandings of operations with whole numbers to add and subtract integers with procedural fluency. **Clarifications:** *Clarification 1:* Instruction begins with the use of manipulatives, models and number lines working towards becoming procedurally fluent by the end of grade 6. *Clarification 2:* Instruction focuses on the inverse relationship between the operations of addition and subtraction. If p and q are integers, then p-q=p+(-q) and p+q=p-(-q).
MA.6.NSO.4.2:	Apply and extend previous understandings of operations with whole numbers to multiply and divide integers with procedural fluency. **Clarifications:** *Clarification 1:* Instruction includes the use of models and number lines and the inverse relationship between multiplication and division, working towards becoming procedurally fluent by the end of grade 6. *Clarification 2:* Instruction focuses on the understanding that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers where q≠0, then $-\left(\frac{p}{q}\right)=\frac{-p}{q}$, $-\left(\frac{p}{q}\right)=\frac{p}{-q}$ and $\frac{p}{q}=\frac{-p}{-q}$.

Mathematicians who participate in effortful learning both individually and with others:

- Analyze the problem in a way that makes sense given the task.
- Ask questions that will help with solving the task.
- Build perseverance by modifying methods as needed while solving a challenging task.
- Stay engaged and maintain a positive mindset when working to solve tasks.
- Help and support each other when attempting a new method or approach.

MA.K12.MTR.1.1:

Clarifications:
Teachers who encourage students to participate actively in effortful learning both individually and with others:

- Cultivate a community of growth mindset learners.
- Foster perseverance in students by choosing tasks that are challenging.
- Develop students' ability to analyze and problem solve.
- Recognize students' effort when solving challenging problems.

Demonstrate understanding by representing problems in multiple ways.
Mathematicians who demonstrate understanding by representing problems in multiple ways:

- Build understanding through modeling and using manipulatives.
- Represent solutions to problems in multiple ways using objects, drawings, tables, graphs and equations.
- Progress from modeling problems with objects and drawings to using algorithms and equations.
- Express connections between concepts and representations.
- Choose a representation based on the given context or purpose.

MA.K12.MTR.2.1:

Clarifications:
Teachers who encourage students to demonstrate understanding by representing problems in multiple ways:

- Help students make connections between concepts and representations.
- Provide opportunities for students to use manipulatives when investigating concepts.
- Guide students from concrete to pictorial to abstract representations as understanding progresses.
- Show students that various representations can have different purposes and can be useful in different situations.

Complete tasks with mathematical fluency.
Mathematicians who complete tasks with mathematical fluency:

- Select efficient and appropriate methods for solving problems within the given context.
- Maintain flexibility and accuracy while performing procedures and mental calculations.
- Complete tasks accurately and with confidence.
- Adapt procedures to apply them to a new context.
- Use feedback to improve efficiency when performing calculations.

MA.K12.MTR.3.1:

Clarifications:
Teachers who encourage students to complete tasks with mathematical fluency:

- Provide students with the flexibility to solve problems by selecting a procedure that allows them to solve efficiently and accurately.
- Offer multiple opportunities for students to practice efficient and generalizable methods.
- Provide opportunities for students to reflect on the method they used and determine if a more efficient method could have been used.

Engage in discussions that reflect on the mathematical thinking of self and others.
Mathematicians who engage in discussions that reflect on the mathematical thinking of self and others:

- Communicate mathematical ideas, vocabulary and methods effectively.
- Analyze the mathematical thinking of others.
- Compare the efficiency of a method to those expressed by others.
- Recognize errors and suggest how to correctly solve the task.
- Justify results by explaining methods and processes.
- Construct possible arguments based on evidence.

MA.K12.MTR.4.1:

Clarifications:
Teachers who encourage students to engage in discussions that reflect on the mathematical thinking of self and others:

- Establish a culture in which students ask questions of the teacher and their peers, and error is an opportunity for learning.
- Create opportunities for students to discuss their thinking with peers.
- Select, sequence and present student work to advance and deepen understanding of correct and increasingly efficient methods.
- Develop students' ability to justify methods and compare their responses to the responses of their peers.

Use patterns and structure to help understand and connect mathematical concepts.
Mathematicians who use patterns and structure to help understand and connect mathematical concepts:

- Focus on relevant details within a problem.
- Create plans and procedures to logically order events, steps or ideas to solve problems.
- Decompose a complex problem into manageable parts.
- Relate previously learned concepts to new concepts.
- Look for similarities among problems.
- Connect solutions of problems to more complicated large-scale situations.

MA.K12.MTR.5.1:

Clarifications:
Teachers who encourage students to use patterns and structure to help understand and connect mathematical concepts:

- Help students recognize the patterns in the world around them and connect these patterns to mathematical concepts.
- Support students to develop generalizations based on the similarities found among problems.
- Provide opportunities for students to create plans and procedures to solve problems.
- Develop students' ability to construct relationships between their current understanding and more sophisticated ways of thinking.

MA.K12.MTR.6.1:	Assess the reasonableness of solutions. Mathematicians who assess the reasonableness of solutions: • Estimate to discover possible solutions. • Use benchmark quantities to determine if a solution makes sense. • Check calculations when solving problems. • Verify possible solutions by explaining the methods used. • Evaluate results based on the given context. **Clarifications:** Teachers who encourage students to assess the reasonableness of solutions: • Have students estimate or predict solutions prior to solving. • Prompt students to continually ask, "Does this solution make sense? How do you know?" • Reinforce that students check their work as they progress within and after a task. • Strengthen students' ability to verify solutions through justifications.
MA.K12.MTR.7.1:	Apply mathematics to real-world contexts. Mathematicians who apply mathematics to real-world contexts: • Connect mathematical concepts to everyday experiences. • Use models and methods to understand, represent and solve problems. • Perform investigations to gather data or determine if a method is appropriate. • Redesign models and methods to improve accuracy or efficiency. **Clarifications:** Teachers who encourage students to apply mathematics to real-world contexts: • Provide opportunities for students to create models, both concrete and abstract, and perform investigations. • Challenge students to question the accuracy of their models and methods. • Support students as they validate conclusions by comparing them to the given situation. • Indicate how various concepts can be applied to other disciplines.
ELD.K12.ELL.MA.1:	English language learners communicate information, ideas and concepts necessary for academic success in the content area of Mathematics.
ELD.K12.ELL.SI.1:	English language learners communicate for social and instructional purposes within the school setting.

General Course Information and Notes

VERSION DESCRIPTION

The benchmarks in this course are mastery goals that students are expected to attain by the end of the year. To build mastery, students will continue to review and apply earlier grade-level benchmarks and expectations.

GENERAL NOTES

In grade 6, instructional time will emphasize five areas: (1) performing all four operations with integers, positive decimals and positive fractions with procedural fluency; (2) exploring and applying concepts of ratios, rates and percent to solve problems; (3) creating, interpreting and using expressions and equations; (4) extending geometric reasoning to plotting points on the coordinate plane, area and volume of geometric figures and (5) extending understanding of statistical thinking.

Curricular content for all subjects must integrate critical-thinking, problem-solving, and workforce-literacy skills; communication, reading, and writing skills; mathematics skills; collaboration skills; contextual and applied-learning skills; technology-literacy skills; information and media-literacy skills; and civic-engagement skills.

English Language Development ELD Standards Special Notes Section:
Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate information, ideas and concepts for academic success in the content area of Mathematics. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. To access an ELL supporting document which delineates performance definitions and descriptors, please click on the following link:
http://www.cpalms.org/uploads/docs/standards/eld/MA.pdf

For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition at sala@fldoe.org.

GENERAL INFORMATION

Course Number: 1205010

Course Type: Core Academic Course

Course Status: Data entry status - hidden

Course Path: Section: Grades PreK to 12 Education Courses > **Grade Group:** Grades 6 to 8 Education Courses > **Subject:** Mathematics > **SubSubject:** General Mathematics >

Abbreviated Title: GRADE SIX MATH

Course Length: Year (Y)

Course Level: 2

Grade Level(s): 6

Educator Certifications

Mathematics (Elementary Grades 1-6)
Middle Grades Mathematics (Middle Grades 5-9)
Middle Grades Integrated Curriculum (Middle Grades 5-9)
Mathematics (Grades 6-12)
Elementary Education (Grades K-6)
Elementary Education (Elementary Grades 1-6)

There are more than 6 related instructional/educational resources available for this on CPALMS. Click on the following link to access them: https://www.cpalms.org?title=2022%20-%20And%20Beyond&isShowCurrent=false/Public/PreviewCourse/Preview/17781

Grade Seven Mathematics (#1205040) 2022 - And Beyond

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Course Standards

Name	Description
MA.7.AR.1.1:	Apply properties of operations to add and subtract linear expressions with rational coefficients. **Clarifications:** *Clarification 1:* Instruction includes linear expressions in the form ax±b or b±ax, where a and b are rational numbers. *Clarification 2:* Refer to Properties of Operations, Equality and Inequality (Appendix D).
MA.7.AR.1.2:	Determine whether two linear expressions are equivalent. **Clarifications:** *Clarification 1:* Instruction includes using properties of operations accurately and efficiently. *Clarification 2:* Instruction includes linear expressions in any form with rational coefficients. *Clarification 3:* Refer to Properties of Operations, Equality and Inequality (Appendix D).
MA.7.AR.2.1:	Write and solve one-step inequalities in one variable within a mathematical context and represent solutions algebraically or graphically. **Clarifications:** *Clarification 1:* Instruction focuses on the properties of inequality. Refer to Properties of Operations, Equality and Inequality (Appendix D). *Clarification 2:* Instruction includes inequalities in the forms $px > q; \frac{x}{p} > q$; x±p>q and p±x>q, where p and q are specific rational numbers and any inequality symbol can be represented. *Clarification 3:* Problems include inequalities where the variable may be on either side of the inequality symbol.
MA.7.AR.2.2:	Write and solve two-step equations in one variable within a mathematical or real-world context, where all terms are rational numbers. **Clarifications:** *Clarification 1:* Instruction focuses the application of the properties of equality. Refer to Properties of Operations, Equality and Inequality (Appendix D). *Clarification 2:* Instruction includes equations in the forms px±q=r and p(x±q)=r, where p, q and r are specific rational numbers. *Clarification 3:* Problems include linear equations where the variable may be on either side of the equal sign.
MA.7.AR.3.1:	Apply previous understanding of percentages and ratios to solve multi-step real-world percent problems. **Clarifications:** *Clarification 1:* Instruction includes discounts, markups, simple interest, tax, tips, fees, percent increase, percent decrease and percent error.
MA.7.AR.3.2:	Apply previous understanding of ratios to solve real-world problems involving proportions.
MA.7.AR.3.3:	Solve mathematical and real-world problems involving the conversion of units across different measurement systems.
MA.7.AR.4.1:	Determine whether two quantities have a proportional relationship by examining a table, graph or written description. **Clarifications:** *Clarification 1:* Instruction focuses on the connection to ratios and on the constant of proportionality, which is the ratio between two quantities in a proportional relationship.
MA.7.AR.4.2:	Determine the constant of proportionality within a mathematical or real-world context given a table, graph or written description of a proportional relationship.
MA.7.AR.4.3:	Given a mathematical or real-world context, graph proportional relationships from a table, equation or a written description. **Clarifications:** *Clarification 1:* Instruction includes equations of proportional relationships in the form of y=px, where p is the constant of proportionality.
MA.7.AR.4.4:	Given any representation of a proportional relationship, translate the representation to a written description, table or equation. **Clarifications:** *Clarification 1:* Given representations are limited to a written description, graph, table or equation. *Clarification 2:* Instruction includes equations of proportional relationships in the form of y=px, where p is the constant of proportionality.
MA.7.AR.4.5:	Solve real-world problems involving proportional relationships.
MA.7.DP.1.1:	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. **Clarifications:** *Clarification 1:* 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. *Clarification 2:* Graphical representations are limited to histograms, line plots, box plots and stem-and-leaf plots. *Clarification 3:* The measure of center is limited to mean and median. The measure of variation is limited to range and interquartile range.

MA.7.DP.1.2:	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. **Clarifications:** *Clarification 1:* Graphical representations are limited to histograms, line plots, box plots and stem-and-leaf plots. *Clarification 2:* The measure of center is limited to mean and median. The measure of variation is limited to range and interquartile range.
MA.7.DP.1.3:	Given categorical data from a random sample, use proportional relationships to make predictions about a population.
MA.7.DP.1.4:	Use proportional reasoning to construct, display and interpret data in circle graphs. **Clarifications:** *Clarification 1:* Data is limited to no more than 6 categories.
MA.7.DP.1.5:	Given a real-world numerical or categorical data set, choose and create an appropriate graphical representation. **Clarifications:** *Clarification 1:* Graphical representations are limited to histograms, bar charts, circle graphs, line plots, box plots and stem-and-leaf plots.
MA.7.DP.2.1:	Determine the sample space for a simple experiment. **Clarifications:** *Clarification 1:* 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.
MA.7.DP.2.2:	Given the probability of a chance event, interpret the likelihood of it occurring. Compare the probabilities of chance events. **Clarifications:** *Clarification 1:* 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. *Clarification 2:* Instruction includes P(event) notation. *Clarification 3:* Instruction includes representing probability as a fraction, percentage or decimal.
MA.7.DP.2.3:	Find the theoretical probability of an event related to a simple experiment. **Clarifications:** *Clarification 1:* Instruction includes representing probability as a fraction, percentage or decimal. *Clarification 2:* 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.
MA.7.DP.2.4:	Use a simulation of a simple experiment to find experimental probabilities and compare them to theoretical probabilities. **Clarifications:** *Clarification 1:* Instruction includes representing probability as a fraction, percentage or decimal. *Clarification 2:* 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. *Clarification 3:* 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.
MA.7.GR.1.1:	Apply formulas to find the areas of trapezoids, parallelograms and rhombi. **Clarifications:** *Clarification 1:* Instruction focuses on the connection from the areas of trapezoids, parallelograms and rhombi to the areas of rectangles or triangles. *Clarification 2:* Within this benchmark, the expectation is not to memorize area formulas for trapezoids, parallelograms and rhombi.
MA.7.GR.1.2:	Solve mathematical or real-world problems involving the area of polygons or composite figures by decomposing them into triangles or quadrilaterals. **Clarifications:** *Clarification 1:* Within this benchmark, the expectation is not to find areas of figures on the coordinate plane or to find missing dimensions.
MA.7.GR.1.3:	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. **Clarifications:** *Clarification 1:* 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. *Clarification 2:* Solutions may be represented in terms of pi (π) or approximately.
MA.7.GR.1.4:	Explore and apply a formula to find the area of a circle to solve mathematical and real-world problems. **Clarifications:** *Clarification 1:* Instruction focuses on the connection between formulas for the area of a rectangle and the area of a circle. *Clarification 2:* Problem types include finding areas of fractional parts of a circle. *Clarification 3:* Solutions may be represented in terms of pi (π) or approximately.
MA.7.GR.1.5:	Solve mathematical and real-world problems involving dimensions and areas of geometric figures, including scale drawings and scale factors. **Clarifications:** *Clarification 1:* Instruction focuses on seeing the scale factor as a constant of proportionality between corresponding lengths in the scale drawing and the original object. *Clarification 2:* Instruction includes the understanding that if the scaling factor is k, then the constant of proportionality between corresponding areas is k^2 . *Clarification 3:* Problem types include finding the scale factor given a set of dimensions as well as finding dimensions when given a scale factor.
	Given a mathematical or real-world context, find the surface area of a right circular cylinder using the figure's net.

MA.7.GR.2.1:	**Clarifications:** *Clarification 1:* Instruction focuses on representing a right circular cylinder with its net and on the connection between surface area of a figure and its net. *Clarification 2:* Within this benchmark, the expectation is to find the surface area when given a net or when given a three-dimensional figure. *Clarification 3:* Within this benchmark, the expectation is not to memorize the surface area formula for a right circular cylinder. Clarification 4: Solutions may be represented in terms of pi (π) or approximately.
MA.7.GR.2.2:	Solve real-world problems involving surface area of right circular cylinders. **Clarifications:** *Clarification 1:* 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. *Clarification 2:* Solutions may be represented in terms of pi (π) or approximately.
MA.7.GR.2.3:	Solve mathematical and real-world problems involving volume of right circular cylinders. **Clarifications:** *Clarification 1:* 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. *Clarification 2:* Solutions may be represented in terms of pi (π) or approximately.
MA.7.NSO.1.1:	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. **Clarifications:** *Clarification 1:* Instruction focuses on building the Laws of Exponents from specific examples. Refer to the K-12 Formulas (Appendix E) for the Laws of Exponents. *Clarification 2:* Problems in the form $\frac{a^n}{a^m} = a^p$ must result in a whole-number value for p.
MA.7.NSO.1.2:	Rewrite rational numbers in different but equivalent forms including fractions, mixed numbers, repeating decimals and percentages to solve mathematical and real-world problems.
MA.7.NSO.2.1:	Solve mathematical problems using multi-step order of operations with rational numbers including grouping symbols, whole-number exponents and absolute value. **Clarifications:** *Clarification 1:* Multi-step expressions are limited to 6 or fewer steps.
MA.7.NSO.2.2:	Add, subtract, multiply and divide rational numbers with procedural fluency.
MA.7.NSO.2.3:	Solve real-world problems involving any of the four operations with rational numbers. **Clarifications:** *Clarification 1:* Instruction includes using one or more operations to solve problems.
MA.K12.MTR.1.1:	Mathematicians who participate in effortful learning both individually and with others: • Analyze the problem in a way that makes sense given the task. • Ask questions that will help with solving the task. • Build perseverance by modifying methods as needed while solving a challenging task. • Stay engaged and maintain a positive mindset when working to solve tasks. • Help and support each other when attempting a new method or approach. **Clarifications:** Teachers who encourage students to participate actively in effortful learning both individually and with others: • Cultivate a community of growth mindset learners. • Foster perseverance in students by choosing tasks that are challenging. • Develop students' ability to analyze and problem solve. • Recognize students' effort when solving challenging problems.
MA.K12.MTR.2.1:	Demonstrate understanding by representing problems in multiple ways. Mathematicians who demonstrate understanding by representing problems in multiple ways: • Build understanding through modeling and using manipulatives. • Represent solutions to problems in multiple ways using objects, drawings, tables, graphs and equations. • Progress from modeling problems with objects and drawings to using algorithms and equations. • Express connections between concepts and representations. • Choose a representation based on the given context or purpose. **Clarifications:** Teachers who encourage students to demonstrate understanding by representing problems in multiple ways: • Help students make connections between concepts and representations. • Provide opportunities for students to use manipulatives when investigating concepts. • Guide students from concrete to pictorial to abstract representations as understanding progresses. • Show students that various representations can have different purposes and can be useful in different situations.
	Complete tasks with mathematical fluency. Mathematicians who complete tasks with mathematical fluency: • Select efficient and appropriate methods for solving problems within the given context. • Maintain flexibility and accuracy while performing procedures and mental calculations. • Complete tasks accurately and with confidence.

MA.K12.MTR.3.1:	• Adapt procedures to apply them to a new context. • Use feedback to improve efficiency when performing calculations. **Clarifications:** Teachers who encourage students to complete tasks with mathematical fluency: • Provide students with the flexibility to solve problems by selecting a procedure that allows them to solve efficiently and accurately. • Offer multiple opportunities for students to practice efficient and generalizable methods. • Provide opportunities for students to reflect on the method they used and determine if a more efficient method could have been used.
MA.K12.MTR.4.1:	Engage in discussions that reflect on the mathematical thinking of self and others. Mathematicians who engage in discussions that reflect on the mathematical thinking of self and others: • Communicate mathematical ideas, vocabulary and methods effectively. • Analyze the mathematical thinking of others. • Compare the efficiency of a method to those expressed by others. • Recognize errors and suggest how to correctly solve the task. • Justify results by explaining methods and processes. • Construct possible arguments based on evidence. **Clarifications:** Teachers who encourage students to engage in discussions that reflect on the mathematical thinking of self and others: • Establish a culture in which students ask questions of the teacher and their peers, and error is an opportunity for learning. • Create opportunities for students to discuss their thinking with peers. • Select, sequence and present student work to advance and deepen understanding of correct and increasingly efficient methods. • Develop students' ability to justify methods and compare their responses to the responses of their peers.
MA.K12.MTR.5.1:	Use patterns and structure to help understand and connect mathematical concepts. Mathematicians who use patterns and structure to help understand and connect mathematical concepts: • Focus on relevant details within a problem. • Create plans and procedures to logically order events, steps or ideas to solve problems. • Decompose a complex problem into manageable parts. • Relate previously learned concepts to new concepts. • Look for similarities among problems. • Connect solutions of problems to more complicated large-scale situations. **Clarifications:** Teachers who encourage students to use patterns and structure to help understand and connect mathematical concepts: • Help students recognize the patterns in the world around them and connect these patterns to mathematical concepts. • Support students to develop generalizations based on the similarities found among problems. • Provide opportunities for students to create plans and procedures to solve problems. • Develop students' ability to construct relationships between their current understanding and more sophisticated ways of thinking.
MA.K12.MTR.6.1:	Assess the reasonableness of solutions. Mathematicians who assess the reasonableness of solutions: • Estimate to discover possible solutions. • Use benchmark quantities to determine if a solution makes sense. • Check calculations when solving problems. • Verify possible solutions by explaining the methods used. • Evaluate results based on the given context. **Clarifications:** Teachers who encourage students to assess the reasonableness of solutions: • Have students estimate or predict solutions prior to solving. • Prompt students to continually ask, "Does this solution make sense? How do you know?" • Reinforce that students check their work as they progress within and after a task. • Strengthen students' ability to verify solutions through justifications.
MA.K12.MTR.7.1:	Apply mathematics to real-world contexts. Mathematicians who apply mathematics to real-world contexts: • Connect mathematical concepts to everyday experiences. • Use models and methods to understand, represent and solve problems. • Perform investigations to gather data or determine if a method is appropriate. • Redesign models and methods to improve accuracy or efficiency. **Clarifications:** Teachers who encourage students to apply mathematics to real-world contexts: • Provide opportunities for students to create models, both concrete and abstract, and perform investigations. • Challenge students to question the accuracy of their models and methods. • Support students as they validate conclusions by comparing them to the given situation. • Indicate how various concepts can be applied to other disciplines.
ELD.K12.ELL.MA.1:	English language learners communicate information, ideas and concepts necessary for academic success in the content area of Mathematics.
ELD.K12.ELL.SI.1:	English language learners communicate for social and instructional purposes within the school setting.

General Course Information and Notes

VERSION DESCRIPTION

The benchmarks in this course are mastery goals that students are expected to attain by the end of the year. To build mastery, students will continue to review and apply earlier grade-level benchmarks and expectations.

GENERAL NOTES

In grade 7, instructional time will emphasize five areas: (1) recognizing that fractions, decimals and percentages are different representations of rational numbers and performing all four operations with rational numbers with procedural fluency; (2) creating equivalent expressions and solving equations and inequalities; (3) developing understanding of and applying proportional relationships in two variables; (4) extending analysis of two- and three-dimensional figures to include circles and cylinders and (5) representing and comparing categorical and numerical data and developing understanding of probability.

Curricular content for all subjects must integrate critical-thinking, problem-solving, and workforce-literacy skills; communication, reading, and writing skills; mathematics skills; collaboration skills; contextual and applied-learning skills; technology-literacy skills; information and media-literacy skills; and civic-engagement skills.

English Language Development ELD Standards Special Notes Section:
Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate information, ideas and concepts for academic success in the content area of Mathematics. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. To access an ELL supporting document which delineates performance definitions and descriptors, please click on the following link:
http://www.cpalms.org/uploads/docs/standards/eld/MA.pdf

For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition at sala@fldoe.org.

GENERAL INFORMATION

Course Number: 1205040

Course Type: Core Academic Course

Course Status: Data entry status - hidden

Grade Level(s): 7

Course Path: Section: Grades PreK to 12 Education Courses > **Grade Group:** Grades 6 to 8 Education Courses > **Subject:** Mathematics > **SubSubject:** General Mathematics >

Abbreviated Title: GRADE SEVEN MATH

Course Length: Year (Y)

Course Level: 2

Educator Certifications

Middle Grades Mathematics (Middle Grades 5-9)
Middle Grades Integrated Curriculum (Middle Grades 5-9)
Mathematics (Grades 6-12)

There are more than 6 related instructional/educational resources available for this on CPALMS. Click on the following link to access them: https://www.cpalms.org?title=2022%20-%20And%20Beyond&isShowCurrent=false/Public/PreviewCourse/Preview/17782

Grade Eight Mathematics: Pre-Algebra (#1205070) 2022 - And Beyond

This document was generated on CPALMS - www.cpalms.org

You are not viewing the current course, please click the current year's tab.

Course Standards

Name	Description
MA.8.AR.1.1:	Apply the Laws of Exponents to generate equivalent algebraic expressions, limited to integer exponents and monomial bases. **Clarifications:** *Clarification 1:* Refer to the K-12 Formulas (Appendix E) for the Laws of Exponents.
MA.8.AR.1.2:	Apply properties of operations to multiply two linear expressions with rational coefficients. **Clarifications:** *Clarification 1:* Problems are limited to products where at least one of the factors is a monomial. *Clarification 2:* Refer to Properties of Operations, Equality and Inequality (Appendix D).
MA.8.AR.1.3:	Rewrite the sum of two algebraic expressions having a common monomial factor as a common factor multiplied by the sum of two algebraic expressions.
MA.8.AR.2.1:	Solve multi-step linear equations in one variable, with rational number coefficients. Include equations with variables on both sides. **Clarifications:** *Clarification 1:* Problem types include examples of one-variable linear equations that generate one solution, infinitely many solutions or no solution.
MA.8.AR.2.2:	Solve two-step linear inequalities in one variable and represent solutions algebraically and graphically. **Clarifications:** *Clarification 1:* Instruction includes inequalities in the forms $px \pm q > r$ and $p(x \pm q) > r$, where p, q and r are specific rational numbers and where any inequality symbol can be represented. *Clarification 2:* Problems include inequalities where the variable may be on either side of the inequality.
MA.8.AR.2.3:	Given an equation in the form of $x^2=p$ and $x^3=q$, where p is a whole number and q is an integer, determine the real solutions. **Clarifications:** *Clarification 1:* Instruction focuses on understanding that when solving $x^2=p$, there is both a positive and negative solution. *Clarification 2:* Within this benchmark, the expectation is to calculate square roots of perfect squares up to 225 and cube roots of perfect cubes from -125 to 125.
MA.8.AR.3.1:	Determine if a linear relationship is also a proportional relationship. **Clarifications:** *Clarification 1:* Instruction focuses on the understanding that proportional relationships are linear relationships whose graph passes through the origin. *Clarification 2:* Instruction includes the representation of relationships using tables, graphs, equations and written descriptions.
MA.8.AR.3.2:	Given a table, graph or written description of a linear relationship, determine the slope. **Clarifications:** *Clarification 1:* Problem types include cases where two points are given to determine the slope. *Clarification 2:* Instruction includes making connections of slope to the constant of proportionality and to similar triangles represented on the coordinate plane.
MA.8.AR.3.3:	Given a table, graph or written description of a linear relationship, write an equation in slope-intercept form.
MA.8.AR.3.4:	Given a mathematical or real-world context, graph a two-variable linear equation from a written description, a table or an equation in slope-intercept form.
MA.8.AR.3.5:	Given a real-world context, determine and interpret the slope and y-intercept of a two-variable linear equation from a written description, a table, a graph or an equation in slope-intercept form. **Clarifications:** *Clarification 1:* Problems include conversions with temperature and equations of lines of fit in scatter plots.
MA.8.AR.4.1:	Given a system of two linear equations and a specified set of possible solutions, determine which ordered pairs satisfy the system of linear equations. **Clarifications:** *Clarification 1:* Instruction focuses on the understanding that a solution to a system of equations satisfies both linear equations simultaneously.
MA.8.AR.4.2:	Given a system of two linear equations represented graphically on the same coordinate plane, determine whether there is one solution, no solution or infinitely many solutions.
	Given a mathematical or real-world context, solve systems of two linear equations by graphing. **Clarifications:**

MA.8.AR.4.3:	*Clarification 1:* Instruction includes approximating non-integer solutions. *Clarification 2:* Within this benchmark, it is the expectation to represent systems of linear equations in slope-intercept form only. *Clarification 3:* Instruction includes recognizing that parallel lines have the same slope.
MA.8.DP.1.1:	Given a set of real-world bivariate numerical data, construct a scatter plot or a line graph as appropriate for the context. **Clarifications:** *Clarification 1:* Instruction includes recognizing similarities and differences between scatter plots and line graphs, and on determining which is more appropriate as a representation of the data based on the context. *Clarification 2:* Sets of data are limited to 20 points.
MA.8.DP.1.2:	Given a scatter plot within a real-world context, describe patterns of association. **Clarifications:** *Clarification 1:* Descriptions include outliers; positive or negative association; linear or nonlinear association; strong or weak association.
MA.8.DP.1.3:	Given a scatter plot with a linear association, informally fit a straight line. **Clarifications:** *Clarification 1:* Instruction focuses on the connection to linear functions. *Clarification 2:* Instruction includes using a variety of tools, including a ruler, to draw a line with approximately the same number of points above and below the line.
MA.8.DP.2.1:	Determine the sample space for a repeated experiment. **Clarifications:** *Clarification 1:* Instruction includes recording sample spaces for repeated experiments using organized lists, tables or tree diagrams. *Clarification 2:* Experiments to be repeated are limited to tossing a fair coin, rolling a fair die, picking a card randomly from a deck with replacement, picking marbles randomly from a bag with replacement and spinning a fair spinner. *Clarification 3:* Repetition of experiments is limited to two times except for tossing a coin.
MA.8.DP.2.2:	Find the theoretical probability of an event related to a repeated experiment. **Clarifications:** *Clarification 1:* Instruction includes representing probability as a fraction, percentage or decimal. *Clarification 2:* Experiments to be repeated are limited to tossing a fair coin, rolling a fair die, picking a card randomly from a deck with replacement, picking marbles randomly from a bag with replacement and spinning a fair spinner. *Clarification 3:* Repetition of experiments is limited to two times except for tossing a coin.
MA.8.DP.2.3:	Solve real-world problems involving probabilities related to single or repeated experiments, including making predictions based on theoretical probability. **Clarifications:** *Clarification 1:* Instruction includes making connections to proportional relationships and representing probability as a fraction, percentage or decimal. *Clarification 2:* Experiments to be repeated are limited to tossing a fair coin, rolling a fair die, picking a card randomly from a deck with replacement, picking marbles randomly from a bag with replacement and spinning a fair spinner. *Clarification 3:* Repetition of experiments is limited to two times except for tossing a coin.
MA.8.F.1.1:	Given a set of ordered pairs, a table, a graph or mapping diagram, determine whether the relationship is a function. Identify the domain and range of the relation. **Clarifications:** *Clarification 1:* Instruction includes referring to the input as the independent variable and the output as the dependent variable. *Clarification 2:* Within this benchmark, it is the expectation to represent domain and range as a list of numbers or as an inequality.
MA.8.F.1.2:	Given a function defined by a graph or an equation, determine whether the function is a linear function. Given an input-output table, determine whether it could represent a linear function. **Clarifications:** *Clarification 1:* Instruction includes recognizing that a table may not determine a function.
MA.8.F.1.3:	Analyze a real-world written description or graphical representation of a functional relationship between two quantities and identify where the function is increasing, decreasing or constant. **Clarifications:** *Clarification 1:* Problem types are limited to continuous functions. *Clarification 2:* Analysis includes writing a description of a graphical representation or sketching a graph from a written description.
MA.8.GR.1.1:	Apply the Pythagorean Theorem to solve mathematical and real-world problems involving unknown side lengths in right triangles. **Clarifications:** *Clarification 1:* Instruction includes exploring right triangles with natural-number side lengths to illustrate the Pythagorean Theorem. *Clarification 2:* Within this benchmark, the expectation is to memorize the Pythagorean Theorem. *Clarification 3:* Radicands are limited to whole numbers up to 225.
MA.8.GR.1.2:	Apply the Pythagorean Theorem to solve mathematical and real-world problems involving the distance between two points in a coordinate plane. **Clarifications:** *Clarification 1:* Instruction includes making connections between distance on the coordinate plane and right triangles. *Clarification 2:* Within this benchmark, the expectation is to memorize the Pythagorean Theorem. It is not the expectation to use the distance formula. *Clarification 3:* Radicands are limited to whole numbers up to 225.

MA.8.GR.1.3:	Use the Triangle Inequality Theorem to determine if a triangle can be formed from a given set of sides. Use the Pythagorean Theorem to determine if a right triangle can be formed from a given set of sides.
MA.8.GR.1.4:	Solve mathematical problems involving the relationships between supplementary, complementary, vertical or adjacent angles.
MA.8.GR.1.5:	Solve problems involving the relationships of interior and exterior angles of a triangle. **Clarifications:** *Clarification 1:* Problems include using the Triangle Sum Theorem and representing angle measures as algebraic expressions.
MA.8.GR.1.6:	Develop and use formulas for the sums of the interior angles of regular polygons by decomposing them into triangles. **Clarifications:** *Clarification 1:* Problems include representing angle measures as algebraic expressions.
MA.8.GR.2.1:	Given a preimage and image generated by a single transformation, identify the transformation that describes the relationship. **Clarifications:** *Clarification 1:* Within this benchmark, transformations are limited to reflections, translations or rotations of images. *Clarification 2:* Instruction focuses on the preservation of congruence so that a figure maps onto a copy of itself.
MA.8.GR.2.2:	Given a preimage and image generated by a single dilation, identify the scale factor that describes the relationship. **Clarifications:** *Clarification 1:* Instruction includes the connection to scale drawings and proportions. *Clarification 2:* Instruction focuses on the preservation of similarity and the lack of preservation of congruence when a figure maps onto a scaled copy of itself, unless the scaling factor is 1.
MA.8.GR.2.3:	Describe and apply the effect of a single transformation on two-dimensional figures using coordinates and the coordinate plane. **Clarifications:** *Clarification 1:* Within this benchmark, transformations are limited to reflections, translations, rotations or dilations of images. *Clarification 2:* Lines of reflection are limited to the x-axis, y-axis or lines parallel to the axes. *Clarification 3:* Rotations must be about the origin and are limited to 90°, 180°, 270° or 360°. *Clarification 4:* Dilations must be centered at the origin.
MA.8.GR.2.4:	Solve mathematical and real-world problems involving proportional relationships between similar triangles.
MA.8.NSO.1.1:	Extend previous understanding of rational numbers to define irrational numbers within the real number system. Locate an approximate value of a numerical expression involving irrational numbers on a number line. **Clarifications:** *Clarification 1:* Instruction includes the use of number line and rational number approximations, and recognizing pi (π) as an irrational number. *Clarification 2:* Within this benchmark, the expectation is to approximate numerical expressions involving one arithmetic operation and estimating square roots or pi (π).
MA.8.NSO.1.2:	Plot, order and compare rational and irrational numbers, represented in various forms. **Clarifications:** *Clarification 1:* Within this benchmark, it is not the expectation to work with the number e. *Clarification 2:* Within this benchmark, the expectation is to plot, order and compare square roots and cube roots. *Clarification 3:* Within this benchmark, the expectation is to use symbols (<, > or =).
MA.8.NSO.1.3:	Extend previous understanding of the Laws of Exponents to include integer exponents. Apply the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions, limited to integer exponents and rational number bases, with procedural fluency. **Clarifications:** *Clarification 1:* Refer to the K-12 Formulas (Appendix E) for the Laws of Exponents.
MA.8.NSO.1.4:	Express numbers in scientific notation to represent and approximate very large or very small quantities. Determine how many times larger or smaller one number is compared to a second number.
MA.8.NSO.1.5:	Add, subtract, multiply and divide numbers expressed in scientific notation with procedural fluency. **Clarifications:** *Clarification 1:* Within this benchmark, for addition and subtraction with numbers expressed in scientific notation, exponents are limited to within 2 of each other.
MA.8.NSO.1.6:	Solve real-world problems involving operations with numbers expressed in scientific notation. **Clarifications:** *Clarification 1:* Instruction includes recognizing the importance of significant digits when physical measurements are involved. *Clarification 2:* Within this benchmark, for addition and subtraction with numbers expressed in scientific notation, exponents are limited to within 2 of each other.
MA.8.NSO.1.7:	Solve multi-step mathematical and real-world problems involving the order of operations with rational numbers including exponents and radicals. **Clarifications:** *Clarification 1:* Multi-step expressions are limited to 6 or fewer steps. *Clarification 2:* Within this benchmark, the expectation is to simplify radicals by factoring square roots of perfect squares up to 225 and cube roots of perfect cubes from -125 to 125.
	Mathematicians who participate in effortful learning both individually and with others: • Analyze the problem in a way that makes sense given the task. • Ask questions that will help with solving the task. • Build perseverance by modifying methods as needed while solving a challenging task. • Stay engaged and maintain a positive mindset when working to solve tasks.

- Help and support each other when attempting a new method or approach.

MA.K12.MTR.1.1:

Clarifications:
Teachers who encourage students to participate actively in effortful learning both individually and with others:
- Cultivate a community of growth mindset learners.
- Foster perseverance in students by choosing tasks that are challenging.
- Develop students' ability to analyze and problem solve.
- Recognize students' effort when solving challenging problems.

Demonstrate understanding by representing problems in multiple ways.
Mathematicians who demonstrate understanding by representing problems in multiple ways:

- Build understanding through modeling and using manipulatives.
- Represent solutions to problems in multiple ways using objects, drawings, tables, graphs and equations.
- Progress from modeling problems with objects and drawings to using algorithms and equations.
- Express connections between concepts and representations.

MA.K12.MTR.2.1:

- Choose a representation based on the given context or purpose.

Clarifications:
Teachers who encourage students to demonstrate understanding by representing problems in multiple ways:
- Help students make connections between concepts and representations.
- Provide opportunities for students to use manipulatives when investigating concepts.
- Guide students from concrete to pictorial to abstract representations as understanding progresses.
- Show students that various representations can have different purposes and can be useful in different situations.

Complete tasks with mathematical fluency.
Mathematicians who complete tasks with mathematical fluency:

- Select efficient and appropriate methods for solving problems within the given context.
- Maintain flexibility and accuracy while performing procedures and mental calculations.
- Complete tasks accurately and with confidence.
- Adapt procedures to apply them to a new context.

MA.K12.MTR.3.1:

- Use feedback to improve efficiency when performing calculations.

Clarifications:
Teachers who encourage students to complete tasks with mathematical fluency:
- Provide students with the flexibility to solve problems by selecting a procedure that allows them to solve efficiently and accurately.
- Offer multiple opportunities for students to practice efficient and generalizable methods.
- Provide opportunities for students to reflect on the method they used and determine if a more efficient method could have been used.

Engage in discussions that reflect on the mathematical thinking of self and others.
Mathematicians who engage in discussions that reflect on the mathematical thinking of self and others:

- Communicate mathematical ideas, vocabulary and methods effectively.
- Analyze the mathematical thinking of others.
- Compare the efficiency of a method to those expressed by others.
- Recognize errors and suggest how to correctly solve the task.
- Justify results by explaining methods and processes.

MA.K12.MTR.4.1:

- Construct possible arguments based on evidence.

Clarifications:
Teachers who encourage students to engage in discussions that reflect on the mathematical thinking of self and others:
- Establish a culture in which students ask questions of the teacher and their peers, and error is an opportunity for learning.
- Create opportunities for students to discuss their thinking with peers.
- Select, sequence and present student work to advance and deepen understanding of correct and increasingly efficient methods.
- Develop students' ability to justify methods and compare their responses to the responses of their peers.

Use patterns and structure to help understand and connect mathematical concepts.
Mathematicians who use patterns and structure to help understand and connect mathematical concepts:

- Focus on relevant details within a problem.
- Create plans and procedures to logically order events, steps or ideas to solve problems.
- Decompose a complex problem into manageable parts.
- Relate previously learned concepts to new concepts.
- Look for similarities among problems.

MA.K12.MTR.5.1:

- Connect solutions of problems to more complicated large-scale situations.

Clarifications:
Teachers who encourage students to use patterns and structure to help understand and connect mathematical concepts:
- Help students recognize the patterns in the world around them and connect these patterns to mathematical concepts.
- Support students to develop generalizations based on the similarities found among problems.
- Provide opportunities for students to create plans and procedures to solve problems.
- Develop students' ability to construct relationships between their current understanding and more sophisticated ways of thinking.

Assess the reasonableness of solutions.
Mathematicians who assess the reasonableness of solutions:

- Estimate to discover possible solutions.
- Use benchmark quantities to determine if a solution makes sense.
- Check calculations when solving problems.

	• Verify possible solutions by explaining the methods used.
MA.K12.MTR.6.1:	• Evaluate results based on the given context.
	Clarifications: Teachers who encourage students to assess the reasonableness of solutions: • Have students estimate or predict solutions prior to solving. • Prompt students to continually ask, "Does this solution make sense? How do you know?" • Reinforce that students check their work as they progress within and after a task. • Strengthen students' ability to verify solutions through justifications.
	Apply mathematics to real-world contexts. Mathematicians who apply mathematics to real-world contexts: • Connect mathematical concepts to everyday experiences. • Use models and methods to understand, represent and solve problems. • Perform investigations to gather data or determine if a method is appropriate. • Redesign models and methods to improve accuracy or efficiency.
MA.K12.MTR.7.1:	**Clarifications:** Teachers who encourage students to apply mathematics to real-world contexts: • Provide opportunities for students to create models, both concrete and abstract, and perform investigations. • Challenge students to question the accuracy of their models and methods. • Support students as they validate conclusions by comparing them to the given situation. • Indicate how various concepts can be applied to other disciplines.
ELD.K12.ELL.MA.1:	English language learners communicate information, ideas and concepts necessary for academic success in the content area of Mathematics.
ELD.K12.ELL.SI.1:	English language learners communicate for social and instructional purposes within the school setting.

General Course Information and Notes

VERSION DESCRIPTION

The benchmarks in this course are mastery goals that students are expected to attain by the end of the year. To build mastery, students will continue to review and apply earlier grade-level benchmarks and expectations.

GENERAL NOTES

In grade 8, instructional time will emphasize six areas: (1) representing numbers in scientific notation and extending the set of numbers to the system of real numbers, which includes irrational numbers; (2) generate equivalent numeric and algebraic expressions including using the Laws of Exponents; (3) creating and reasoning about linear relationships including modeling an association in bivariate data with a linear equation; (4) solving linear equations, inequalities and systems of linear equations; (5) developing an understanding of the concept of a function and (6) analyzing two-dimensional figures, particularly triangles, using distance, angle and applying the Pythagorean Theorem.

Curricular content for all subjects must integrate critical-thinking, problem-solving, and workforce-literacy skills; communication, reading, and writing skills; mathematics skills; collaboration skills; contextual and applied-learning skills; technology-literacy skills; information and media-literacy skills; and civic-engagement skills.

English Language Development ELD Standards Special Notes Section:
Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate information, ideas and concepts for academic success in the content area of Mathematics. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. To access an ELL supporting document which delineates performance definitions and descriptors, please click on the following link:
http://www.cpalms.org/uploads/docs/standards/eld/MA.pdf

For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition at sala@fldoe.org.

GENERAL INFORMATION

Course Number: 1205070

Course Path: Section: Grades PreK to 12 Education Courses > **Grade Group:** Grades 6 to 8 Education Courses > **Subject:** Mathematics > **SubSubject:** General Mathematics >
Abbreviated Title: GRADE EIGHT:.PRE-ALG
Course Length: Year (Y)

Course Type: Core Academic Course
Course Status: Data entry status - hidden
Grade Level(s): 8

Course Level: 2

Educator Certifications

Mathematics (Grades 6-12)
Middle Grades Mathematics (Middle Grades 5-9)
Middle Grades Integrated Curriculum (Middle Grades 5-9)

There are more than 6 related instructional/educational resources available for this on CPALMS. Click on the following link to access them: https://www.cpalms.org?title=2022%20-%20And%20Beyond&isShowCurrent=false/Public/PreviewCourse/Preview/17783