# Introduction to Algebra Yearlong Mathematics Map

**Resources:** Approved from Board of Education

**Assessments:** PARCC Assessments, Performance Series, District Benchmark Assessments

**Common Core State Standards – Standards for Mathematical Practice:**

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

| Domain | Cluster | Common Core Standard | Content | Skills | Academic Vocabulary |
|---|---|---|---|---|---|
| RP | Analyze proportional relationships and use them to solve real-world and mathematical problems. | 7.RP.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour, equivalently 2 miles per hour. | Ratio<br>Unit Rate | 7.RP.1 Compute unit rates with ratio of fractions including ratios of length, areas, and other quantities of like or different units. | Complex fraction<br>Ratio<br>Unit Rate |
| RP | Analyze proportional relationships and use them to solve real-world and mathematical problems. | 7.RP.2 Recognize and represent proportional relationships between quantities. | Proportional Relationships | 7.RP.2 | Proportion (equivalent ratio)<br>Proportional relationship<br>Scale factor |
| RP | Analyze proportional relationships and use them to solve real-world and mathematical problems. | 7.RP.2a Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. | Proportional Relationships | 7.RP.2a Decide whether two quantities are in a proportional relationship by using a table or graphing on a coordinate plane. | Proportional Relationship<br>Proportion<br>Coordinate Plane<br>Origin<br>x-coordinate<br>y-coordinate<br>quadrant<br>x-axis<br>y-axis<br>scale |

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|---|---|---|---|---|---|
| RP | Analyze proportional relationships and use them to solve real-world and mathematical problems. | 7.RP.2b Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. | Unit Rate | 7.RP.2b Derive the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. | Unit Rate<br>Table<br>Graph<br>Diagrams<br>Equations |
| RP | Analyze proportional relationships and use them to solve real-world and mathematical problems. | 7.RP.2c Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn. | Proportional Relationships | 7.RP.2c Write equations to represent proportional relationships. | Proportional relationships<br>Equation<br>Proportion |
| RP | Analyze proportional relationships and use them to solve real-world and mathematical problems. | 7.RP.2d Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate. | Proportional Relationships | 7.RP.2d Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate. | Unit Rate<br>Rate of change (slope)<br>Graphs<br>Equations<br>Origin<br>Ordered pair<br>x-axis<br>y-axis<br>x coordinate<br>y coordinate<br>Coordinate plane |

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|---|---|---|---|---|---|
| RP | Analyze proportional relationships and use them to solve real-world and mathematical problems. | 7.RP.3 Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error. | Proportional Relationships | 7.RP.3 Solve multi-step ratio and percent problems using proportional relationships. | Proportional relationship<br>Proportion<br>Ratio<br>Percent<br>Percent error<br>Simple Interest<br>Percent increase<br>Percent decrease<br>Markup<br>Sales Tax<br>Commissions<br>Gratutidies |
| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. | | 7.NS.1 | |
| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.1a Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged. | Rational Numbers | 7.NS.1a Describe situations in which opposite quantities combine to make 0. | Property of Opposites |

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| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.1b Understand p + q as the number located a distance \|q\| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. | Rational Numbers | 7.NS.1b Explain p + q as the number located a distance \|q\| from p on a number line, in the positive or negative direction depending on whether q is positive or negative. | Rational numbers<br>Vertical number line<br>Horizontal number line<br>Property of Opposites<br>Positive number<br>Negative number<br>Combine<br>Number line |
| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.1b Understand p + q as the number located a distance \|q\| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. | Rational Numbers | 7.NS.1b Prove that a number and its opposite have a sum of 0 (are additive inverses). | Rational number<br>Absolute value<br>Combine (Additive Inverses)<br>Property of opposites |
| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.1b Understand p + q as the number located a distance \|q\| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. | Rational Numbers | 7.NS.1b Interpret sums of rational numbers by describing real-world contexts. | Rational number |
| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.1c Understand subtraction of rational numbers as adding the additive inverse, p – q = p + (–q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. | Subtraction<br>Rational numbers | 7.NS.1c Explain subtraction of rational numbers as adding the additive inverse | Rational number<br>Combine (Additive Inverses)<br>Absolute Value |

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|---|---|---|---|---|---|
| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.1c Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. | Subtraction<br>Rational numbers | 7.NS.1c Prove that the distance between two rational numbers on the number line is the absolute value of their difference. | Rational number<br>Absolute Value<br>Number line<br>Positive numbers<br>Negative numbers |
| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.1d Apply properties of operations as strategies to add and subtract rational numbers. | Properties of Operations | 7.NS.1d Apply properties of operations as strategies to add and subtract rational numbers. | Rational number<br>Associative Property<br>Commutative Property<br>Additive Identity<br>Property of Opposites |
| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. | Multiplication and Division of Rational Numbers | 7.NS.2 | |
| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.2a Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. | Multiplication<br>Rational Numbers | 7.NS.2a Apply the properties of multiplication and rules for multiplying signed numbers to rational numbers. | Rational number<br>Distributive Property<br>Associative Property<br>Commutative Property<br>Multiplicative Identity<br>Fraction<br>Signed numbers |

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| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.2a Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. | Multiplication<br>Rational Numbers | 7.NS.2a Interpret products of rational numbers by describing real-world contexts. | Rational number<br>Product |
| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.2b Understand 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, then –(p/q) = (–p)/q = p/(–q). Interpret quotients of rational numbers by describing real-world contexts. | Divide rational numbers | 7.NS.2b Explain 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. | Integers<br>Rational numbers<br>divisors<br>quotients<br>Undefined quotient |
| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.2b Understand 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, then –(p/q) = (–p)/q = p/(–q). Interpret quotients of rational numbers by describing real-world contexts. | Divide rational numbers | 7.NS.2b Interpret quotients of rational numbers by describing real-world contexts. | Quotient<br>Rational numbers |
| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.2c Apply properties of operations as strategies to multiply and divide rational numbers. | Multiplication<br>Rational Numbers | 7.NS.2c Apply properties of operations as strategies to multiply rational numbers. | Rational number<br>Associative Property<br>Commutative Property<br>Multiplicative Identity |

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| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.2c Apply properties of operations as strategies to multiply and divide rational numbers. | divide rational numbers | 7.NS.2c Apply properties of operations as strategies to divide rational numbers. | Rational number<br>Associative Property<br>Commutative Property<br>Multiplicative Identity |
| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.2d Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats. | rational numbers | 7.NS.2d Convert a rational number to a decimal using long division | Rational number<br>decimal<br>place value<br>terminating decimal<br>repeating decimal<br>bar notation |
| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.2d Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats. | rational numbers | 7.NS.2d Recognize that the decimal form of a rational number terminates in 0s or eventually repeats. | Rational number<br>decimal<br>place value<br>terminating decimal<br>repeating decimal<br>bar notation |
| NS | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | 7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers. | rational numbers | 7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers including complex fractions. | Rational number<br>Complex fractions |

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|---|---|---|---|---|---|
| EE | Use properties of operations to generate equivalent expressions. | 7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. | Equivalent Expressions | 7.EE.1 Add and subtract linear expressions with rational coefficients, using properties of operations. | Associative Property<br>Commutative Property<br>Distributive Property<br>Linear expression<br>Rational coefficent |
| EE | Use properties of operations to generate equivalent expressions. | 7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. | Equivalent Expressions | 7.EE.1 Factor and expand linear expressions with rational coefficients, using properties of operations. | Associative Property<br>Commutative Property<br>Distributive Property<br>Linear expression<br>Factor<br>Rational coefficent |
| EE | Use properties of operations to generate equivalent expressions. | 7.EE.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, a + 0.05a = 1.05a means that “increase by 5%” is the same as “multiply by 1.05.” | Equivalent Expressions | 7.EE.2 Rewriting an expression in different forms in a problem context to shed light on the problem and how the quantities in it are related. | Equivalent ratio<br>expression<br>equation<br>decimal<br>percent<br>fraction |

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| EE | Solve real-life and mathematical problems using numerical and algebraic expressions and equations. | 7.EE.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation. | Algebraic expressions<br>Algebraic equations<br>Numerical expressions<br>Numerical equations | 7.EE.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form. Convert if necessary. | Positive number<br>Negative number<br>Rational number<br>Equation<br>Expression<br>Decimal<br>Percent<br>Fraction |
| EE | Solve real-life and mathematical problems using numerical and algebraic expressions and equations. | 7.EE.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation. | Algebraic expressions<br>Algebraic equations<br>Numerical expressions<br>Numerical equations | 7.EE.3 Evaluate the reasonableness of answers using mental computation and estimation strategies. Convert if necessary. | Estimation<br>Resonable<br>expression<br>equation<br>decimal<br>percent<br>fraction |

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| EE | Solve real-life and mathematical problems using numerical and algebraic expressions and equations. | 7.EE.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. | Algebraic expressions and algebraic inequalities | 7.EE.4 Choose variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems by reasoning about the quantities. | Rational numbers<br>Variables<br>Equation<br>Inequality |
| EE | Solve real-life and mathematical problems using numerical and algebraic expressions and equations. | 7.EE.4a Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width? | Algebraic and numerical equations | 7.EE.4a Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. | Rational numbers<br>Variables<br>Equation<br>Inequality |
| EE | Solve real-life and mathematical problems using numerical and algebraic expressions and equations. | 7.EE.4a Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width? | Algebraic and numerical equations | 7.EE.4a Compare an algebraic solution to an arithmetic solution by Identifying the sequence of the operations used in each approach. | Rational numbers<br>Variables<br>Equation<br>Inequality |
| EE | Solve real-life and mathematical problems using numerical and algebraic expressions and equations. | 7.EE.4b Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions. | Algebraic inequalities<br>Numerical inequalities | 7.EE.4b Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. | Inequality<br>Rational numbers<br>Solution set<br>Infinite |

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| EE | Solve real-life and mathematical problems using numerical and algebraic expressions and equations. | 7.EE.4b Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions. | Algebraic inequalities<br>Numerical inequalities | 7.EE.4b Graph the solution set of the inequality. | Solution set<br>Inequality<br>Number line<br>Infinite |
| EE | Solve real-life and mathematical problems using numerical and algebraic expressions and equations. | 7.EE.4b Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions. | Algebraic inequalities<br>Numerical inequalities | 7.EE.4b Interpret the solution set in the context of the problem. | Solution set<br>Inequality<br>Number line<br>Infinite |
| NS | Know that there are numbers that are not rational, and approximate them by rational numbers. | 8.NS.1 Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational. | rational number<br>irrational number | 8.NS.1 Classify numbers as rational (terminating or repeating) or irrational by using the decimal expansion | irrational numbers |
| NS | Know that there are numbers that are not rational, and approximate them by rational numbers. | 8.NS.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., $\pi^2$). For example, by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations. | rational number<br>irrational number | 8.NS.2 Compare the size of irrational numbers by approximating | truncate, irrational numbers |

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| NS | Know that there are numbers that are not rational, and approximate them by rational numbers. | 8.NS.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., $\pi^2$). For example, by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations. | rational number irrational number | 8.NS.2 Locate approximate placement or irrational number on a number line diagram | |
| NS | Know that there are numbers that are not rational, and approximate them by rational numbers. | 8.NS.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., $\pi^2$). For example, by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations. | rational number irrational number | 8.NS.2 Estimate the value of an expression | |
| EE | Expressions and EquationsWork with radicals and integer exponents. | 8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/33 = 1/27$. | exponent properties | 8.EE.1 Apply the properties of integer exponents to simplify expressions | positive and negative exponents |
| EE | Expressions and EquationsWork with radicals and integer exponents. | 8.EE.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational. | radicals expressions integer exponents | 8.EE.2 Represent solutions to equations as square or cube roots | Square Root Cube Root |
| EE | Expressions and EquationsWork with radicals and integer exponents. | 8.EE.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational. | radicals expressions integer exponents | 8.EE.2 Evaluate square and cube roots of small perfect squares and cubes (but do not simplify non perfect radicals) | Perfect squares Non-perfect squares |

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| EE | Expressions and EquationsWork with radicals and integer exponents. | 8.EE.3 Use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3 times $10^8$ and the population of the world as 7 times $10^9$, and determine that the world population is more than 20 times larger. | radicals expressions integer exponents | 8.EE.3 Estimate very large or very small quantities as a single digit times a power of 10 | standard notation scientific notation |
| EE | Expressions and EquationsWork with radicals and integer exponents. | 8.EE.3 Use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3 times $10^8$ and the population of the world as 7 times $10^9$, and determine that the world population is more than 20 times larger. | radicals expressions integer exponents | 8.EE.3 Compare estimations of very large or very small quantities when expressed as a single digit times a power of 10 | standard notation scientific notation |
| EE | Expressions and EquationsWork with radicals and integer exponents. | 8.EE.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology. | radicals expressions integer exponents scientific notation | 8.EE.4 Utilize scientific notation and choose units of appropriate size for measurements of very large or very small quantities | scientific notation |

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| EE | Expressions and EquationsWork with radicals and integer exponents. | 8.EE.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology. | radical expressions<br>integer exponents<br>scientific notation | 8.EE.4 Perform operations with numbers expressed in scientific notation | |
| EE | Expressions and EquationsWork with radicals and integer exponents. | 8.EE.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology. | radical expressions<br>integer exponents<br>scientific notation | 8.EE.4 Interpret scientific notation that has been generated by technology | |
| EE | Understand the connections between proportional relationships, lines, and linear equations. | 8.EE.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed. | proportional relationships<br>linear equations | 8.EE.5 Graph proportional relationships | slope, proportional relationship (direct variation) |
| EE | Understand the connections between proportional relationships, lines, and linear equations. | 8.EE.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed. | proportional relationships<br>linear equations | 8.EE.5 Interpret the unit rate as the slope of the graph. | |

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| EE | Understand the connections between proportional relationships, lines, and linear equations. | 8.EE.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed. | proportional relationships linear equations | 8.EE.5 Compare two different proportional relationships represented in different ways | |
| EE | Understand the connections between proportional relationships, lines, and linear equations. | 8.EE.6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b. | proportional relationships linear equations similarity | 8.EE.6 Explain why slope is the same between 2 distinct points on a line using similar triangles | slope similar triangles |
| EE | Understand the connections between proportional relationships, lines, and linear equations. | 8.EE.6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b. | proportional relationships linear equations similarity | 8.EE.6 Derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b. | slope-intercept form y-intercept origin |
| EE | Analyze and solve linear equations and pairs of simultaneous linear equations. | 8.EE.7a Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers). | Linear equations | 8.EE.7a Create examples of linear equations in one variable with one solution, no solutions or infinitely many solutions. | null infinite no solution consistent inconsistent |
| EE | Analyze and solve linear equations and pairs of simultaneous linear equations. | 8.EE.7b Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. | Linear equations | 8.EE.7b Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. | |

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|---|---|---|---|---|---|
| EE | Analyze and solve linear equations and pairs of simultaneous linear equations. | 8.EE.8a Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. | Simultaneous Equations | 8.EE.8a Recognize that solutions to a system of two linear equations in two variables corresponds to points of intersection of their graphs. | system of equations point of intersection |
| EE | Analyze and solve linear equations and pairs of simultaneous linear equations. | 8.EE.8b Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6. | Simultaneous Equations | 8.EE.8b Estimate the solutions of systems of two linear equations in two variables by graphing the equations. | |
| EE | Analyze and solve linear equations and pairs of simultaneous linear equations. | 8.EE.8b Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6. | Simultaneous Equations | 8.EE.8b Solve systems of two linear equations in two variables algebraically. | |
| EE | Analyze and solve linear equations and pairs of simultaneous linear equations. | 8.EE.8b Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6. | Simultaneous Equations | 8.EE.8b Solve simple cases of systems of two linear equations in two variables by inspection. | |
| EE | Analyze and solve linear equations and pairs of simultaneous linear equations. | 8.EE.8c Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair. | Simultaneous Equations | 8.EE.8c Solve real-world and mathematical problems leading to two linear equations in two variables. | |
| F | Define, evaluate, and compare functions. | 8.F.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.1 | Functions | 8.F.1 Identify that a function is a rule that assigns to each input exactly one output. | Function Input Output Independent Dependent |

| Domain | Cluster | Common Core Standard | Content | Skills | Academic Vocabulary |
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| F | Define, evaluate, and compare functions. | 8.F.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.2 | Functions | 8.F.1 Recognize that a graph consisting of sets of ordered pairs, each with an input and the corresponding output is a function. | Domain Range |
| F | Define, evaluate, and compare functions. | 8.F.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change. | Functions | 8.F.2 Compare properties of two functions each represented in a different way, including: algebraically, graphically, numerically in tables, or by verbal descriptions. | |
| F | Define, evaluate, and compare functions. | 8.F.3 Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line. | Functions | 8.F.3 Determine whether a function is linear as written in the form y = mx + b | |
| F | Use functions to model relationships between quantities. | 8.F.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. | Functions | 8.F.4 Calcuate the rate of change and the initial value of a function from a description of a relationship or from two (x, y) values, including a table or graph. | rate of change initial value |

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| F | Use functions to model relationships between quantities. | 8.F.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. | Functions | 8.F.4 Construct a function to model a linear relationship between two quantities. | |
| F | Use functions to model relationships between quantities. | 8.F.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. | Functions | 8.F.4 Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. | |
| F | Use functions to model relationships between quantities. | 8.F.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally. | Functions | 8.F.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph. | |
| F | Use functions to model relationships between quantities. | 8.F.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally. | Functions | 8.F.5 Construct a graph that exhibits the qualitative features of a function that has been described verbally. | |
| SP | Investigate patterns of association in bivariate data. | 8.SP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. | scatter plot | 8.SP.1 Construct scatter plots for two variables. | independent & dependent variables, bivariate measurement, positive, negative, and no association |

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| SP | Investigate patterns of association in bivariate data. | 8.SP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. | scatter plot | 8.SP.1 Interpret scatter plots for two variables. | |
| SP | Investigate patterns of association in bivariate data. | 8.SP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. | scatter plot | 8.SP.1 Describe patterns in scatter plots. | |
| SP | Investigate patterns of association in bivariate data. | 8.SP.2 Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. | scatter plot | 8.SP.2 Construct a line of best fit. | |
| SP | Investigate patterns of association in bivariate data. | 8.SP.2 Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. | scatter plot | 8.SP.2 Informally assess a line of best fit. | line of best fit; also known as trend lines in science |
| SP | Investigate patterns of association in bivariate data. | 8.SP.2 Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. | scatter plot | 8.SP.2 Derive the equation of a line of best fit. | |

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| SP | Investigate patterns of association in bivariate data. | 8.SP.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height. | scatter plot | 8.SP.3 Explain what the slope of the line means in terms of the given data. | |
| SP | Investigate patterns of association in bivariate data. | 8.SP.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height. | scatter plot | 8.SP.3 Explain what the x and y intercepts of the line mean in terms of the given data. | |