

| Learning Standards  | <i>Write Math Answers to Open-Ended Questions in Algebra,<br/>New Readers Press</i> |
|---|---|
| <b>Number Sense and Operations</b>  |   |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>  |   |
| 6.N.1 Demonstrate an understanding of positive integer exponents, in particular, when used in powers of ten, e.g., $10^2$ , $10^5$ .  | SE: pp. 12–15   |
| 6.N.2 Demonstrate an understanding of place value to billions and thousandths.  |   |
| 6.N.3 Represent and compare very large (billions) and very small (thousandths) positive numbers in various forms such as expanded notation without exponents, e.g., $9724 = 9 \times 1000 + 7 \times 100 + 2 \times 10 + 4$ .                   |   |
| 6.N.4 Demonstrate an understanding of fractions as a ratio of whole numbers, as parts of unit wholes, as parts of a collection, and as locations on the number line.  | SE: pp. 40–43, 48–51, 52–55, 56–59, 60–63   |
| 6.N.5 Identify and determine common equivalent fractions, mixed numbers, decimals, and percents.  | SE: pp. 40–43, 60–63, 64–67, 68–71  |
| 6.N.6 Find and position integers, fractions, mixed numbers, and decimals (both positive and negative) on the number line.   | SE: pp. 4–7   |
| 6.N.7 Compare and order integers (including negative integers), and positive fractions, mixed numbers, decimals, and percents.  | SE: pp. 40–43   |
| 6.N.8 Apply number theory concepts—including prime and composite numbers, prime factorization, greatest common factor, least common multiple, and divisibility rules for 2, 3, 4, 5, 6, 9, and 10—to the solution of problems.                  |   |
| 6.N.9 Select and use appropriate operations to solve problems involving addition, subtraction, multiplication, division, and positive integer exponents with whole numbers, and with positive fractions, mixed numbers, decimals, and percents. | SE: pp. 8–11, 12–15, 16–19, 20–23, 24–27, 28–31, 32–35, 36–39                       |

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| 6.N.10 Use the number line to model addition and subtraction of integers, with the exception of subtracting negative integers.  | SE: pp. 4–7   |
| 6.N.11 Apply the Order of Operations for expressions involving addition, subtraction, multiplication, and division with grouping symbols (+, −, ×, ÷).  | SE: pp. 12–15, 16–19  |
| 6.N.12 Demonstrate an understanding of the inverse relationship of addition and subtraction, and use that understanding to simplify computation and solve problems.   | SE: pp. 24–27, 28–31  |
| 6.N.13 Accurately and efficiently add, subtract, multiply, and divide (with double-digit divisors) whole numbers and positive decimals.   | SE: pp. 24–27, 28–31, 32–35, 36–39, 44–47, 68–69, 72–75                             |
| 6.N.14 Accurately and efficiently add, subtract, multiply, and divide positive fractions and mixed numbers. Simplify fractions.   | SE: pp. 48–51, 52–55, 56–59   |
| 6.N.15 Add and subtract integers, with the exception of subtracting negative integers.  |   |
| 6.N.16 Estimate results of computations with whole numbers, and with positive fractions, mixed numbers, decimals, and percents. Describe reasonableness of estimates.   |   |
| <b>Patterns, Relations and Algebra</b>  |   |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>  |   |
| 6.P.1 Analyze and determine the rules for extending symbolic, arithmetic, and geometric patterns and progressions, e.g., ABBCCC; 1, 5, 9, 13 ...; 3, 9, 27, ....  | SE: pp. 9, 11, 72–75, 76–79   |
| 6.P.2 Replace variables with given values and evaluate/simplify, e.g., $2(\bigcirc) + 3$ when $\bigcirc = 4$ .  | SE: pp. 6–19, 64–67   |
| 6.P.3 Use the properties of equality to solve problems, e.g., if $\square + 7 = 13$ , then $\square = 13 - 7$ , therefore $\square = 6$ ; if $3 \times \square = 15$ , then $\frac{1}{3} \times 3 \times \square = \frac{1}{3} \times 15$ , therefore $\square = 5$ . | SE: pp. 24–27, 28–31, 32–35, 36–39  |

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| 6.P.4 Represent real situations and mathematical relationships with concrete models, tables, graphs, and rules in words and with symbols, e.g., input-output tables.  | SE: pp. 16–19, 20–23, 24–27, 28–31, 32–35, 36–39, 48–51, 52–55, 56–59, 64–67, 68–71, 72–75 |
| 6.P.5 Solve linear equations using concrete models, tables, graphs, and paper-pencil methods.   | SE: pp. 72–75  |
| 6.P.6 Produce and interpret graphs that represent the relationship between two variables in everyday situations.  | SE: pp. 76–79  |
| 6.P.7 Identify and describe relationships between two variables with a constant rate of change. Contrast these with relationships where the rate of change is not constant.   | SE: pp. 72–75, 76–79   |
| <b>Geometry</b>   |  |
| <i>Students engage in problem solving, communicating, reasoning, connecting and representing as they:</i>   |  |
| 6.G.1 Identify polygons based on their properties, including types of interior angles, perpendicular or parallel sides, and congruence of sides, e.g., squares, rectangles, rhombuses, parallelograms, trapezoids, and isosceles, equilateral, and right triangles. |  |
| 6.G.2 Identify three-dimensional shapes (e.g., cubes, prisms, spheres, cones, and pyramids) based on their properties, such as edges and faces.   |  |
| 6.G.3 Identify relationships among points, lines, and planes, e.g., intersecting, parallel, perpendicular.  |  |
| 6.G.4 Graph points and identify coordinates of points on the Cartesian coordinate plane (all four quadrants).   |  |
| 6.G.5 Find the distance between two points on horizontal or vertical number lines.  |  |
| 6.G.6 Predict, describe, and perform transformations on two-dimensional shapes, e.g., translations, rotations, and reflections.   |  |

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| 6.G.7 Identify types of symmetry, including line and rotational.  |   |
| 6.G.8 Determine if two shapes are congruent by measuring sides or a combination of sides and angles, as necessary; or by motions or series of motions, e.g., translations, rotations, and reflections.              |   |
| 6.G.9 Match three-dimensional objects and their two-dimensional representations, e.g., nets, projections, and perspective drawings.   |   |
| <b>Measurement</b>  |   |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>  |   |
| 6.M.1 Apply the concepts of perimeter and area to the solution of problems. Apply formulas where appropriate.   |   |
| 6.M.2 Identify, measure, describe, classify, and construct various angles, triangles, and quadrilaterals.   |   |
| 6.M.3 Solve problems involving proportional relationships and units of measurement, e.g., same system unit conversions, scale models, maps, and speed.  | SE: pp. 44–47, 48–51, 52–55, 56–59  |
| 6.M.4 Find areas of triangles and parallelograms. Recognize that shapes with the same number of sides but different appearances can have the same area. Develop strategies to find the area of more complex shapes. |   |
| 6.M.5 Identify, measure, and describe circles and the relationships of the radius, diameter, circumference, and area (e.g., $d = 2r$ , $\pi = C/d$ ), and use the concepts to solve problems.                       |   |
| 6.M.6 Find volumes and surface areas of rectangular prisms.   |   |
| 6.M.7 Find the sum of the angles in simple polygons (up to eight sides) with and without measuring the angles.  |   |

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| <b>Data Analysis, Statistics and Probability</b>   |   |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>   |   |
| 6.D.1 Describe and compare data sets using the concepts of median, mean, mode, maximum and minimum, and range.   |   |
| 6.D.2 Construct and interpret stem-and-leaf plots, line plots, and circle graphs.  |   |
| 6.D.3 Use tree diagrams and other models (e.g., lists and tables) to represent possible or actual outcomes of trials. Analyze the outcomes.  |   |
| 6 D.4 Predict the probability of outcomes of simple experiments (e.g., tossing a coin, rolling a die) and test the predictions. Use appropriate ratios between 0 and 1 to represent the probability of the outcome and associate the probability with the likelihood of the event. |   |

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| <b>Number Sense and Operations</b>  |   |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>  |   |
| 7 N.1 Compare, order, estimate, and translate among integers, fractions and mixed numbers (i.e., rational numbers), decimals, and percents.   | SE: pp. 40–43, 60–63, 64–67   |
| 7 N.2 Define, compare, order, and apply frequently used irrational numbers, such as $\sqrt{2}$ and $\pi$ .  | SE: pp. 40–43, 44–47, 48–51, 52–55, 56–59   |
| 7 N.3 Use ratios and proportions in the solution of problems, in particular, problems involving unit rates, scale factors, and rate of change.  | SE: pp. 4–7   |
| 7 N.4 Represent numbers in scientific notation, and use them in calculations and problem situations.  |   |
| 7 N.5 Apply number theory concepts, including prime factorization and relatively prime numbers, to the solution of problems.  | SE: pp. 8–11  |
| 7 N.6 Demonstrate an understanding of absolute value, e.g., $ -3  =  3  = 3$ .  | SE: pp. 20–23, 24–27, 28–31, 48–51, 52–55, 56–59, 64–67                             |
| 7 N.7 Apply the rules of powers and roots to the solution of problems. Extend the Order of Operations to include positive integer exponents and square roots.   | SE: pp. 40–43, 60–63, 64–67   |
| 7 N.8 Demonstrate an understanding of the properties of arithmetic operations on rational numbers. Use the associative, commutative, and distributive properties; properties of the identity and inverse elements (e.g., $-7 + 7 = 0$ ; $3/4 \times 4/3 = 1$ ); and the notion of closure of a subset of the rational numbers under an operation (e.g., the set of odd integers is closed under multiplication but not under addition). | SE: pp. 4–7   |

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| 7 N.9 Use the inverse relationships of addition and subtraction, multiplication and division, and squaring and finding square roots to simplify computations and solve problems, e.g. multiplying by $\frac{1}{2}$ or 0.5 is the same as dividing by 2. | SE: pp. 12–15, 16–19, 20–23, 24–27, 28–31, 32–35                                |
| 7 N.10 Estimate and compute with fractions (including simplification of fractions), integers, decimals, and percents (including those greater than 100 and less than 1).  |   |
| 7 N.11 Determine when an estimate rather than an exact answer is appropriate and apply in problem situations.   |   |
| 7 N.12 Select and use appropriate operations—addition, subtraction, multiplication, division, and positive integer exponents—to solve problems with rational numbers (including negatives).   |   |
| <b>Patterns, Relations and Algebra</b>  |   |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>  |   |
| 7 P.1 Extend, represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic expressions. Include arithmetic and geometric progressions, e.g., compounding.  | SE: pp. 72–75, 76–79  |
| 7 P.2 Evaluate simple algebraic expressions for given variable values, e.g., $3a^2 - b$ for $a = 3$ and $b = 7$ .   | SE: pp. 8–11, 12–15   |
| 7 P.3 Demonstrate an understanding of the identity $(-x)(-y) = xy$ . Use this identity to simplify algebraic expressions, e.g., $(-2)(-x+2) = 2x - 4$ .   | SE: pp. 12–15, 16–19, 20–23, 24–27, 28–31, 32–35, 36–39, 72–75, 76–79           |
| 7 P.4 Create and use symbolic expressions and relate them to verbal, tabular, and graphical representations.  | SE: pp. 16–19, 20–23, 24–27, 28–31, 68–71                                       |
| 7 P.5 Identify the slope of a line as a measure of its steepness and as a constant rate of change from its table of values, equation, or graph. Apply the concept of slope to the solution of problems.   | SE: pp. 68–71   |

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| 7 P.6 Identify the roles of variables within an equation, e.g., $y = mx + b$ , expressing $y$ as a function of $x$ with parameters $m$ and $b$ .   | SE: pp. 40–43, 68–71  |
| 7 P.7 Set up and solve linear equations and inequalities with one or two variables, using algebraic methods, models, and/or graphs.  |   |
| 7 P.8 Explain and analyze—both quantitatively and qualitatively, using pictures, graphs, charts, or equations—how a change in one variable results in a change in another variable in functional relationships, e.g., $C = \pi d$ , $A = \pi r^2$ ( $A$ as a function of $r$ ), $A_{\text{rectangle}} = lw$ ( $A_{\text{rectangle}}$ as a function of $l$ and $w$ ). |   |
| 7 P.9 Use linear equations to model and analyze problems involving proportional relationships. Use technology as appropriate.  |   |
| 7 P.10 Use tables and graphs to represent and compare linear growth patterns. In particular, compare rates of change and $x$ - and $y$ -intercepts of different linear patterns.   |   |
| <b>Geometry</b>  |   |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>   |   |
| 7 G.1 Analyze, apply, and explain the relationship between the number of sides and the sums of the interior and exterior angle measures of polygons.   |   |
| 7 G.2 Classify figures in terms of congruence and similarity, and apply these relationships to the solution of problems.   | SE: pp. 52–55   |
| 7 G.3 Demonstrate an understanding of the relationships of angles formed by intersecting lines, including parallel lines cut by a transversal.   |   |

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| 7 G.4 Demonstrate an understanding of the Pythagorean theorem. Apply the theorem to the solution of problems.  | SE: pp. 76–79   |
| 7 G.5 Use a straightedge, compass, or other tools to formulate and test conjectures, and to draw geometric figures.  |   |
| 7 G.6 Predict the results of transformations on unmarked or coordinate planes and draw the transformed figure, e.g., predict how tessellations transform under translations, reflections, and rotations.   |   |
| 7 G.7 Identify three-dimensional figures (e.g., prisms, pyramids) by their physical appearance, distinguishing attributes, and spatial relationships such as parallel faces.   |   |
| 7 G.8 Recognize and draw two-dimensional representations of three-dimensional objects, e.g., nets, projections, and perspective drawings.  |   |
| <b>Measurement</b>   |   |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>   |   |
| 7 M.1 Select, convert (within the same system of measurement), and use appropriate units of measurement or scale.  | SE: pp. 44–47   |
| 7 M.2 Given the formulas, convert from one system of measurement to another. Use technology as appropriate.  | SE: pp. 48–51   |
| 7 M.3 Demonstrate an understanding of the concepts and apply formulas and procedures for determining measures, including those of area and perimeter/circumference of parallelograms, trapezoids, and circles. Given the formulas, determine the surface area and volume of rectangular prisms, cylinders, and spheres. Use technology as appropriate. | SE: pp. 8–11, 14, 15  |

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| 7 M.4 Use ratio and proportion (including scale factors) in the solution of problems, including problems involving similar plane figures and indirect measurement.   |   |
| 7 M.5 Use models, graphs, and formulas to solve simple problems involving rates, e.g., velocity and density.   |   |
| <b>Data Analysis, Statistics and Probability</b>   |   |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>   |   |
| 7 D.1 Describe the characteristics and limitations of a data sample. Identify different ways of selecting a sample, e.g., convenience sampling, responses to a survey, random sampling.  |   |
| 7 D.2 Select, create, interpret, and utilize various tabular and graphical representations of data, e.g., circle graphs, Venn diagrams, scatterplots, stem-and-leaf plots, box-and-whisker plots, histograms, tables, and charts. Differentiate between continuous and discrete data and ways to represent them. | SE: pp. 36–39   |
| 7 D.3 Find, describe, and interpret appropriate measures of central tendency (mean, median, and mode) and spread (range) that represent a set of data. Use these notions to compare different sets of data.  |   |
| 7 D.4 Use tree diagrams, tables, organized lists, basic combinatorics (“fundamental counting principle”), and area models to compute probabilities for simple compound events, e.g., multiple coin tosses or rolls of dice.  |   |

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| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>  |   |
| 8.N.1 Compare, order, estimate, and translate among integers, fractions and mixed numbers (i.e., rational numbers), decimals, and percents.   | SE: pp. 44–47, 48–51  |
| 8.N.2 Define, compare, order, and apply frequently used irrational numbers, such as $\sqrt{2}$ and $\pi$ .  |   |
| 8.N.3 Use ratios and proportions in the solution of problems, in particular, problems involving unit rates, scale factors, and rate of change.  | SE: pp. 36–39, 40–43, 44–47   |
| 8.N.4 Represent numbers in scientific notation, and use them in calculations and problem situations.  |   |
| 8.N.5 Apply number theory concepts, including prime factorization and relatively prime numbers, to the solution of problems.  |   |
| 8.N.6 Demonstrate an understanding of absolute value, e.g., $ -3  =  3  = 3$ .  |   |
| 8.N.7 Apply the rules of powers and roots to the solution of problems. Extend the Order of Operations to include positive integer exponents and square roots.   | SE: pp. 8–11  |
| 8.N.8 Demonstrate an understanding of the properties of arithmetic operations on rational numbers. Use the associative, commutative, and distributive properties; properties of the identity and inverse elements (e.g., $-7 + 7 = 0$ ; $3/4 \times 4/3 = 1$ ); and the notion of closure of a subset of the rational numbers under an operation (e.g., the set of odd integers is closed under multiplication but not under addition). | SE: pp. 4–7   |

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| 8.N.9 Use the inverse relationships of addition and subtraction, multiplication and division, and squaring and finding square roots to simplify computations and solve problems, e.g. multiplying by $\frac{1}{2}$ or 0.5 is the same as dividing by 2. | SE: pp. 12–15, 16–19, 20–23, 24–27   |
| 8.N.10 Estimate and compute with fractions (including simplification of fractions), integers, decimals, and percents (including those greater than 100 and less than 1).  | SE: pp. 44–47, 48–51   |
| 8.N.11 Determine when an estimate rather than an exact answer is appropriate and apply in problem situations.   |  |
| 8.N.12 Select and use appropriate operations—addition, subtraction, multiplication, division, and positive integer exponents—to solve problems with rational numbers (including negatives).   | SE: pp. 8–11, 12–15, 16–19, 20–23, 24–27   |
| <b>Patterns, Relations and Algebra</b>  |  |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>  |  |
| 8.P.1 Extend, represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic expressions. Include arithmetic and geometric progressions, e.g., compounding.  | SE: pp. 52–55  |
| 8.P.2 Evaluate simple algebraic expressions for given variable values, e.g., $3a^2 - b$ for $a = 3$ and $b = 7$ .   | SE: pp. 68–71, 72–75, 76–79  |
| 8.P.3 Demonstrate an understanding of the identity $(-x)(-y) = xy$ . Use this identity to simplify algebraic expressions, e.g., $(-2)(-x+2) = 2x - 4$ .   |  |
| 8.P.4 Create and use symbolic expressions and relate them to verbal, tabular, and graphical representations.  | SE: pp. 4–7, 8–11, 12–15, 16–19, 20–23, 24–27, 28–31, 32–35, 44–47, 52–55, 64–67, 68–71, 76–79 |

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| 8.P.5 Identify the slope of a line as a measure of its steepness and as a constant rate of change from its table of values, equation, or graph. Apply the concept of slope to the solution of problems.  | SE: pp. 60–63, 64–67, 68–71   |
| 8.P.6 Identify the roles of variables within an equation, e.g., $y = mx + b$ , expressing $y$ as a function of $x$ with parameters $m$ and $b$ .   | SE: pp. 4–7   |
| 8.P.7 Set up and solve linear equations and inequalities with one or two variables, using algebraic methods, models, and/or graphs.  | SE: pp. 20–23, 24–27, 28–31, 32–35, 44–47, 52–55, 76–79                             |
| 8.P.8 Explain and analyze—both quantitatively and qualitatively, using pictures, graphs, charts, or equations—how a change in one variable results in a change in another variable in functional relationships, e.g., $C = \pi d$ , $A = \pi r^2$ ( $A$ as a function of $r$ ), $A_{\text{rectangle}} = lw$ ( $A_{\text{rectangle}}$ as a function of $l$ and $w$ ). | SE: pp. 4–7   |
| 8.P.9 Use linear equations to model and analyze problems involving proportional relationships. Use technology as appropriate.  |   |
| 8.P.10 Use tables and graphs to represent and compare linear growth patterns. In particular, compare rates of change and $x$ - and $y$ -intercepts of different linear patterns.   | SE: pp. 64–67, 68–71  |
| <b>Geometry</b>  |   |
| <i>Students engage in problem solving, communicating, reasoning, connecting and representing as they:</i>  |   |
| 8.G.1 Analyze, apply, and explain the relationship between the number of sides and the sums of the interior and exterior angle measures of polygons.   |   |
| 8.G.2 Classify figures in terms of congruence and similarity, and apply these relationships to the solution of problems.   | SE: pp. 40–43   |

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| 8.G.3 Demonstrate an understanding of the relationships of angles formed by intersecting lines, including parallel lines cut by a transversal.   |   |
| 8.G.4 Demonstrate an understanding of the Pythagorean theorem. Apply the theorem to the solution of problems.  |   |
| 8.G.5 Use a straightedge, compass, or other tools to formulate and test conjectures, and to draw geometric figures.  |   |
| 8.G.6 Predict the results of transformations on unmarked or coordinate planes and draw the transformed figure, e.g., predict how tessellations transform under translations, reflections, and rotations. |   |
| 8.G.7 Identify three-dimensional figures (e.g., prisms, pyramids) by their physical appearance, distinguishing attributes, and spatial relationships such as parallel faces.                             |   |
| 8.G.8 Recognize and draw two-dimensional representations of three-dimensional objects, e.g., nets, projections, and perspective drawings.  |   |
| <b>Measurement</b>   |   |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>   |   |
| 8.M.1 Select, convert (within the same system of measurement), and use appropriate units of measurement or scale.  | SE: pp. 36–39   |
| 8.M.2 Given the formulas, convert from one system of measurement to another. Use technology as appropriate.  |   |

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| 8.M.3 Demonstrate an understanding of the concepts and apply formulas and procedures for determining measures, including those of area and perimeter/circumference of parallelograms, trapezoids, and circles. Given the formulas, determine the surface area and volume of rectangular prisms, cylinders, and spheres. Use technology as appropriate. | SE: pp. 4–6, 20–23, 28–30   |
| 8.M.4 Use ratio and proportion (including scale factors) in the solution of problems, including problems involving similar plane figures and indirect measurement.   | SE: pp. 40–43   |
| 8.M.5 Use models, graphs, and formulas to solve simple problems involving rates, e.g., velocity and density.   | SE: pp. 36–39   |
| <b>Data Analysis, Statistics and Probability</b>   |   |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>   |   |
| 8.D.1 Describe the characteristics and limitations of a data sample. Identify different ways of selecting a sample, e.g., convenience sampling, responses to a survey, random sampling.  |   |
| 8.D.2 Select, create, interpret, and utilize various tabular and graphical representations of data, e.g., circle graphs, Venn diagrams, scatterplots, stem-and-leaf plots, box-and-whisker plots, histograms, tables, and charts. Differentiate between continuous and discrete data and ways to represent them.                                       | SE: pp. 56–59   |
| 8.D.3 Find, describe, and interpret appropriate measures of central tendency (mean, median, and mode) and spread (range) that represent a set of data. Use these notions to compare different sets of data.  |   |

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| 8.D.4 Use tree diagrams, tables, organized lists, basic combinatorics (“fundamental counting principle”), and area models to compute probabilities for simple compound events, e.g., multiple coin tosses or rolls of dice. |   |

| Learning Standards for Mathematics  | <i>Write Math Answers to Open-Ended Questions in Algebra, New Readers Press</i> |
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| <b>Number Sense and Operations</b>  |   |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>  |   |
| 9.N.1 Identify and use the properties of operations on real numbers, including the associative, commutative, and distributive properties; the existence of the identity and inverse elements for addition and multiplication; the existence of $n^{\text{th}}$ roots of positive real numbers for any positive integer $n$ ; and the inverse relationship between taking the $n^{\text{th}}$ root of and the $n^{\text{th}}$ power of a positive real number. | SE: pp. 8–11, 12–15, 16–19, 20–23   |
| 9.N.2 Simplify numerical expressions, including those involving positive integer exponents or the absolute value, e.g., $3(2^4 - 1) = 45$ , $4 3 - 5  + 6 = 14$ ; apply such simplifications in the solution of problems.   | SE: pp. 60–63, 68–71  |
| 9.N.3 Find the approximate value for solutions to problems involving square roots and cube roots without the use of a calculator, e.g., $\sqrt{3^2 - 1} \approx 2.8$ .  | SE: pp. 60–63, 68–71  |
| 9.N.4 Use estimation to judge the reasonableness of results of computations and of solutions to problems involving real numbers.  |   |
| <b>Patterns, Relations and Algebra</b>  |   |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>  |   |
| 9 P.1 Describe, complete, extend, analyze, generalize, and create a wide variety of patterns, including iterative, recursive (e.g., Fibonacci Numbers), linear, quadratic, and exponential functional relationships.  |   |

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| 9 P.2 Demonstrate an understanding of the relationship between various representations of a line. Determine a line's slope and x- and y-intercepts from its graph or from a linear equation that represents the line. Find a linear equation describing a line from a graph or a geometric description of the line, e.g., by using the "point-slope" or "slope y-intercept" formulas. Explain the significance of a positive, negative, zero, or undefined slope. | SE: pp. 28–31, 32–35, 36–39, 44–47  |
| 9 P.3 Add, subtract, and multiply polynomials. Divide polynomials by monomials.   |   |
| 9 P.4 Demonstrate facility in symbolic manipulation of polynomial and rational expressions by rearranging and collecting terms; factoring (e.g., $a^2 - b^2 = (a + b)(a - b)$ , $x^2 + 10x + 21 = (x + 3)(x + 7)$ , $5x^4 + 10x^3 - 5x^2 = 5x^2(x^2 + 2x - 1)$ ); identifying and canceling common factors in rational expressions; and applying the properties of positive integer exponents.  | SE: pp. 60–63, 76–79  |
| 9 P.5 Find solutions to quadratic equations (with real roots) by factoring, completing the square, or using the quadratic formula. Demonstrate an understanding of the equivalence of the methods.  | SE: pp. 60–63, 64–67  |
| 9 P.6 Solve equations and inequalities including those involving absolute value of linear expressions (e.g., $ x - 2  > 5$ ) and apply to the solution of problems.   | SE: pp. 20–23, 48–51  |
| 9 P.7 Solve everyday problems that can be modeled using linear, reciprocal, quadratic, or exponential functions. Apply appropriate tabular, graphical, or symbolic methods to the solution. Include compound interest, and direct and inverse variation problems. Use technology when appropriate.  | SE: pp. 4–7, 8–11, 12–15, 24–27, 40–43, 48–51, 72–75, 76–79                     |

| Learning Standards for Mathematics   | <i>Write Math Answers to Open-Ended Questions in Algebra,</i><br>New Readers Press |
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| 9 P.8 Solve everyday problems that can be modeled using systems of linear equations or inequalities. Apply algebraic and graphical methods to the solution. Use technology when appropriate. Include mixture, rate, and work problems.   | SE: pp. 52–55, 56–59   |
| <b>Geometry</b>  |  |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>   |  |
| 9.G.1 Identify figures using properties of sides, angles, and diagonals. Identify the figures' type(s) of symmetry.  |  |
| 9.G.2 Draw congruent and similar figures using a compass, straightedge, protractor, and other tools such as computer software. Make conjectures about methods of construction. Justify the conjectures by logical arguments.   |  |
| 9.G.3 Recognize and solve problems involving angles formed by transversals of coplanar lines. Identify and determine the measure of central and inscribed angles and their associated minor and major arcs. Recognize and solve problems associated with radii, chords, and arcs within or on the same circle. |  |
| 9.G.4 Apply congruence and similarity correspondences (e.g., $\triangle ABC \cong \triangle XYZ$ ) and properties of the figures to find missing parts of geometric figures, and provide logical justification.  |  |
| 9.G.5 Solve simple triangle problems using the triangle angle sum property and/or the Pythagorean theorem.   |  |
| 9.G.6 Use the properties of special triangles (e.g., isosceles, equilateral, $30^\circ$ – $60^\circ$ – $90^\circ$ , $45^\circ$ – $45^\circ$ – $90^\circ$ ) to solve problems.  |  |

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| 9.G.7 Using rectangular coordinates, calculate midpoints of segments, slopes of lines and segments, and distances between two points, and apply the results to the solutions of problems.  | SE: pp. 44–47, 68–71   |
| 9.G.8 Find linear equations that represent lines either perpendicular or parallel to a given line and through a point, e.g., by using the “point-slope” form of the equation.  |  |
| 9.G.10 Draw the results, and interpret transformations on figures in the coordinate plane, e.g., translations, reflections, rotations, scale factors, and the results of successive transformations. Apply transformations to the solutions of problems. |  |
| 9.G.11 Demonstrate the ability to visualize solid objects and recognize their projections and cross sections.  |  |
| 9.G.12 Use vertex-edge graphs to model and solve problems.   |  |
| <b>Measurement</b>   |  |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>   |  |
| 9.M.1 Calculate perimeter, circumference, and area of common geometric figures such as parallelograms, trapezoids, circles, and triangles.   |  |
| 9.M.2 Given the formula, find the lateral area, surface area, and volume of prisms, pyramids, spheres, cylinders, and cones, e.g., find the volume of a sphere with a specified surface area.  |  |
| 9.M.3 Relate changes in the measurement of one attribute of an object to changes in other attributes, e.g., how changing the radius or height of a cylinder affects its surface area or volume.  |  |
| 9.M.4 Describe the effects of approximate error in measurement and rounding on measurements and on computed values from measurements.  |  |

| Learning Standards for Mathematics   | <i>Write Math Answers to Open-Ended Questions in Algebra,</i><br>New Readers Press |
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| <b>Data Analysis, Statistics, and Probability</b>  |  |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>   |  |
| 9.D.1 Select, create, and interpret an appropriate graphical representation (e.g., scatterplot, table, stem-and-leaf plots, box-and-whisker plots, circle graph, line graph, and line plot) for a set of data and use appropriate statistics (e.g., mean, median, range, and mode) to communicate information about the data. Use these notions to compare different sets of data. | SE: pp. 44–47  |
| 9.D.2 Approximate a line of best fit (trend line) given a set of data (e.g., scatterplot). Use technology when appropriate.  |  |
| 9.D.3 Describe and explain how the relative sizes of a sample and the population affect the validity of predictions from a set of data.  |  |

| Learning Standards for Algebra I  | <i>Write Math Answers to Open-Ended Questions in Algebra,</i><br>New Readers Press |
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| <b>Number Sense and Operations</b>  |  |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>  |  |
| AI.N.1 Identify and use the properties of operations on real numbers, including the associative, commutative, and distributive properties; the existence of the identity and inverse elements for addition and multiplication; the existence of $n^{\text{th}}$ roots of positive real numbers for any positive integer $n$ ; the inverse relationship between taking the $n^{\text{th}}$ root of and the $n^{\text{th}}$ power of a positive real number; and the density of the set of rational numbers in the set of real numbers. | SE: pp. 8–11, 12–15, 16–19, 20–23  |
| AI.N.2 Simplify numerical expressions, including those involving positive integer exponents or the absolute value, e.g., $3(2^4 - 1) = 45$ , $4 3 - 5  + 6 = 14$ ; apply such simplifications in the solution of problems.  | SE: pp. 60–63, 68–71   |
| AI.N.3 Find the approximate value for solutions to problems involving square roots and cube roots without the use of a calculator, e.g., $\sqrt{3^2 - 1} \approx 2.8$ .   | SE: pp. 60–63, 68–71   |
| AI.N.4 Use estimation to judge the reasonableness of results of computations and of solutions to problems involving real numbers.   |  |
| <b>Patterns, Relations and Algebra</b>  |  |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>  |  |
| AI.P.1 Describe, complete, extend, analyze, generalize, and create a wide variety of patterns, including iterative, recursive (e.g., Fibonacci Numbers), linear, quadratic, and exponential functional relationships.   |  |
| AI.P.2 Use properties of the real number system to judge the validity of equations and inequalities, to prove or disprove statements, and to justify every step in a sequential argument.   | SE: pp. 4–7, 8–11, 12–15, 16–19, 48–51   |

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| AI.P.3 Demonstrate an understanding of relations and functions. Identify the domain, range, dependent, and independent variables of functions.   | SE: pp. 40–43, 64–67   |
| AI.P.4 Translate between different representations of functions and relations: graphs, equations, point sets, and tabular.   | SE: pp. 24–27, 40–43, 64–67  |
| AI.P.5 Demonstrate an understanding of the relationship between various representations of a line. Determine a line's slope and x- and y-intercepts from its graph or from a linear equation that represents the line. Find a linear equation describing a line from a graph or a geometric description of the line, e.g., by using the "point-slope" or "slope y-intercept" formulas. Explain the significance of a positive, negative, zero, or undefined slope. | SE: pp. 28–31, 32–35, 36–39, 44–47   |
| AI.P.6 Find linear equations that represent lines either perpendicular or parallel to a given line and through a point, e.g., by using the "point-slope" form of the equation.   |  |
| AI.P.7 Add, subtract, and multiply polynomials. Divide polynomials by monomials.   |  |
| AI.P.8 Demonstrate facility in symbolic manipulation of polynomial and rational expressions by rearranging and collecting terms, factoring (e.g., $a^2 - b^2 = (a + b)(a - b)$ , $x^2 + 10x + 21 = (x + 3)(x + 7)$ , $5x^4 + 10x^3 - 5x^2 = 5x^2(x^2 + 2x - 1)$ ), identifying and canceling common factors in rational expressions, and applying the properties of positive integer exponents.  | SE: pp. 60–63, 76–79   |
| AI.P.9 Find solutions to quadratic equations (with real roots) by factoring, completing the square, or using the quadratic formula. Demonstrate an understanding of the equivalence of the methods.  | SE: pp. 60–63, 64–67   |

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| AI.P.10 Solve equations and inequalities including those involving absolute value of linear expressions (e.g., $ x - 2  > 5$ ) and apply to the solution of problems.  | SE: pp. 20–23, 48–51  |
| AI.P.11 Solve everyday problems that can be modeled using linear, reciprocal, quadratic, or exponential functions. Apply appropriate tabular, graphical, or symbolic methods to the solution. Include compound interest, and direct and inverse variation problems. Use technology when appropriate.   | SE: pp. 4–7, 8–11, 12–15, 24–27, 40–43, 48–51, 72–75, 76–79                     |
| AI.P.12 Solve everyday problems that can be modeled using systems of linear equations or inequalities. Apply algebraic and graphical methods to the solution. Use technology when appropriate. Include mixture, rate, and work problems.   | SE: pp. 52–55, 56–59  |
| <b>Data Analysis, Statistics, and Probability</b>  |   |
| <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i>   |   |
| AI.D.1 Select, create, and interpret an appropriate graphical representation (e.g., scatterplot, table, stem-and-leaf plots, circle graph, line graph, and line plot) for a set of data and use appropriate statistics (e.g., mean, median, range, and mode) to communicate information about the data. Use these notions to compare different sets of data. |   |
| AI.D.2 Approximate a line of best fit (trend line) given a set of data (e.g., scatterplot). Use technology when appropriate.   |   |
| AI.D.3 Describe and explain how the relative sizes of a sample and the population affect the validity of predictions from a set of data.   |   |