| Mathematics Content Standards | *Write Math Answers to Open-Ended Questions in Algebra* New Readers Press |
|---|---|
| **Number Sense** | |
| **1.0 Students compare and order positive and negative fractions, decimals, and mixed numbers. Students solve problems involving fractions, ratios, proportions, and percentages:** | |
| 1.1 Compare and order positive and negative fractions, decimals, and mixed numbers and place them on a number line. | SE: pp. 40–43 |
| 1.2 Interpret and use ratios in different contexts (e.g., batting averages, miles per hour) to show the relative sizes of two quantities, using appropriate notations ( *a*/*b*, *a* to *b*, *a*:*b* ). | SE: pp. 40–43, 52–55, 56–59 |
| 1.3 Use proportions to solve problems (e.g., determine the value of *N* if 4/7 = *N*/21, find the length of a side of a polygon similar to a known polygon). Use cross-multiplication as a method for solving such problems, understanding it as the multiplication of both sides of an equation by a multiplicative inverse. | SE: pp. 44–47, 48–51, 52–55, 56–59, 68–71 |
| 1.4 Calculate given percentages of quantities and solve problems involving discounts at sales, interested earned, and tips. | SE: pp. 60–63, 64–67, 68–71 |
| **2.0 Students calculate and solve problems involving addition, subtraction, multiplication, and division:** | |
| 2.1 Solve problems involving addition, subtraction, multiplication, and division of positive fractions and explain why a particular operation was used for a given situation. | |
| 2.2 Explain the meaning of multiplication and division of positive fractions and perform the calculations (e.g., 5/8 ÷ 15/16 = 5/8 x 16/15 = 2/3). | |

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|---|---|
| 2.3 Solve addition, subtraction, multiplication, and division problems, including those arising in concrete situations, that use positive and negative integers and combinations of these operations. | SE: pp. 4–7, 8–11 |
| 2.4 Determine the least common multiple and the greatest common divisor of whole numbers; use them to solve problems with fractions (e.g., to find a common denominator to add two fractions or to find the reduced form for a fraction). | |
| **Algebra and Functions** | |
| **1.0 Students write verbal expressions and sentences as algebraic expressions and equations; they evaluate algebraic expressions, solve simple linear equations, and graph and interpret their results:** | |
| 1.1 Write and solve one-step linear equations in one variable. | SE: pp. 4–7, 20–23, 24–27, 28–31, 32–35, 36–39, 64–67, 68–71, 76–79 |
| 1.2 Write and evaluate an algebraic expression for a given situation, using up to three variables. | SE: pp. 8–11, 16–19, 20–23, 72–75 |
| 1.3 Apply algebraic order of operations and the commutative, associative, and distributive properties to evaluate expressions; and justify each step in the process. | SE: pp. 12–15, 16–19, 24–27, 28–30, 32–35, 36–39, 48–51 |
| 1.4 Solve problems manually by using the correct order of operations or by using a scientific calculator. | SE: pp. 12–15, 16–19 |
| **2.0 Students analyze and use tables, graphs, and rules to solve problems involving rates and proportions:** | |
| 2.1 Convert one unit of measurement to another (e.g., from feet to miles, from centimeters to inches). | SE: pp. 44–47, 48–49 |
| 2.2 Demonstrate an understanding that *rate* is a measure of one quantity per unit value of another quantity. | SE: pp. 44–47, 48–49, 72–75, 76–79 |

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|---|---|
| 2.3 Solve problems involving rates, average speed, distance, and time. | SE: pp. 44–47, 48–49, 72–75, 76–79 |
| **3.0 Students investigate geometric patterns and describe them algebraically:** | |
| 3.1 Use variables in expressions describing geometric quantities (e.g., $P = 2w + 2l$, $A = 1/2bh$, $C = \pi d$ – the formulas for the perimeter of a rectangle, the area of a triangle, and the circumference of a circle, respectively. | |
| 3.2 Express in symbolic form simple relationships arising from geometry. | SE: pp. 52–55, 56–59 |
| **Measurement and Geometry** | |
| **1.0 Students deepen their understanding of the measurement of plane and solid shapes and use this understanding to solve problems:** | |
| 1.1 Understand the concept of a constant such as $\pi$; know the formulas for the circumference and area of a circle. | |
| 1.2 Know common estimates of $\pi$ (3.14; 22/7) and use these values to estimate and calculate the circumference and the area of circles; compare with actual measurements. | |
| 1.3 Know and use the formulas for the volume of triangular prisms and cylinders (area of base x height); compare these formulas and explain the similarity between them and the formula for the volume of a rectangular solid. | |
| **2.0 Students identify and describe the properties of two-dimensional figures:** | |
| 2.1 Identify angles as vertical, adjacent, complementary, or supplementary and provide descriptions of these terms. | |

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|---|---|
| 2.2 Use the properties of complementary and supplementary angles and the sum of the angles of a triangle to solve problems involving an unknown angle. | |
| 2.3 Draw quadrilaterals and triangles from given information about them (e.g., a quadrilateral having equal sides but no right angles, a right isosceles triangle. | |
| **Statistics, Data Analysis, and Probability** | |
| **1.0 Students compute and analyze statistical measurements for data sets:** | |
| 1.1 Compute the range, mean, median, and mode of data sets. | |
| 1.2 Understand how additional data added to data sets may affect these computations of measures of central tendency. | |
| 1.3 Understand how the inclusion or exclusion of outliers affects measures of central tendency. | |
| 1.4 Know why a specific measure of central tendency (mean, median) provides the most useful information in a given context. | |
| **2.0 Students use data samples of a population and describe the characteristics and limitations of the samples:** | |
| 2.1 Compare different samples of a population with the data from the entire population and identify a situation in which it makes sense to use a sample. | |
| 2.2 Identify different ways of selecting a sample (e.g., convenience sampling, responses to a survey, random sampling) and which method makes a sample more representative for a population. | |

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| 2.3 Analyze data displays and explain why the way in which the question was asked might have influenced the results obtained and why the way in which the results were displayed might have influenced the conclusions reached. | |
| 2.4 Identify data that represent sampling errors and explain why the sample (and the display) might be biased. | |
| 2.5 Identify claims based on statistical data and, in simple cases, evaluate the validity of the claims. | |
| **3.0 Students determine theoretical and experimental probabilities and use these to make predictions about events:** | |
| 3.1 Represent all possible outcomes for compound events in an organized way (e.g., tables, grids, tree diagrams) and express the theoretical probability of each outcome. | |
| 3.2 Use data to estimate the probability of future events (e.g., batting averages or number of accidents per mile driven). | |
| 3.3 Represent probabilities as ratios, proportions, decimals between 0 and 1, and percentages between 0 and 100 and verify that the probabilities computed are reasonable; know that if *P* is the probability of an event, 1-*P* is the probability of an event not occurring. | |
| 3.4 Understand that the probability of either of two disjoint events occurring is the sum of the two individual probabilities and that the probability of one event following another, in independent trials, is the product of the two probabilities. | |

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|---|---|
| 3.5 Understand the difference between independent and dependent events. | |
| **Mathematical Reasoning** | |
| **1.0 Students make decisions about how to approach problems:** | |
| 1.1 Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns. | SE: pp. 12–15, 16–19, 20–23, 24–27, 28–31, 32–35, 36–39, 40–43, 44–47, 48–51, 52–55, 56–59, 60–63, 68–71, 72–75, 76–79 |
| 1.2 Formulate and justify mathematical conjectures based on a general description of the mathematical question or problem posed. | SE: p. 31 #4 |
| 1.3 Determine when and how to break a problem into simpler parts. | |
| **2.0 Students use strategies, skills, and concepts in finding solutions:** | |
| 2.1 Use estimation to verify the reasonableness of calculated results. | SE: pp. 40–43 |
| 2.2 Apply strategies and results from simpler problems to more complex problems. | |
| 2.3 Estimate unknown quantities graphically and solve for them by using logical reasoning and arithmetic and algebraic techniques. | SE: pp. 76–79 |
| 2.4 Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning. | SE: pp. 4–7, 16–19, 20–23, 56–59, 60–63, 65 |
| 2.5 Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work. | SE: pp. 8–11, 16–19, 20–23, 24–27, 28–31, 32–35, 36–39, 40–43, 44–47, 48–51, 52–55, 56–59, 60–63, 64–67, 68–71, 72–75, 76–79 |

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|---|---|
| 2.6 Indicate the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy. | SE: pp. 40–43 |
| 2.7 Make precise calculations and check the validity of the results from the context of the problem. | SE: p. 27 #4, 35 #3, 38 |
| **3.0 Students move beyond a particular problem by generalizing to other situations:** | |
| 3.1 Evaluate the reasonableness of the solution in the context of the original situation. | SE: pp. 39 #3, 63 #4 |
| 3.2 Note the method of deriving the solution and demonstrate a conceptual understanding of the derivation by solving similar problems. | SE: pp. 6–7, 10–11, 14–15, 18–19, 22–23, 26–27, 30–31, 34–35, 38–39, 42–43, 46–47, 50–51, 54–55, 58–59, 62–63, 66–67, 70–71, 74–75, 78–79 |
| 3.3 Develop generalizations of the results obtained and the strategies used and apply them in new problem situations. | SE: pp. 8–11, 48–51, 52–55, 56–59, 67, 68–71 |

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| Mathematics Content Standards | *Write Math Answers to Open-Ended Questions in Algebra* New Readers Press |
|---|---|
| **Number Sense** | |
| **1.0 Students know the properties of, and compute with, rational numbers expressed in a variety of forms:** | |
| 1.1 Read, write, and compare rational numbers in scientific notation (positive and negative powers of 10) with approximate numbers using scientific notation. | SE: pp. 4–5, 7 |
| 1.2 Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers. | SE: pp. 6–7, 8–11 |
| 1.3 Convert fractions to decimals and percents and use these representations in estimations, computations, and applications. | SE: pp. 60–63 |
| 1.4 Differentiate between rational and irrational numbers. | |
| 1.5 Know that every rational number is either a terminating or repeating decimal and be able to convert terminating decimals into reduced fractions. | |
| 1.6 Calculate the percentage of increases and decreases in quantity. | SE: pp. 65, 67 |
| 1.7 Solve problems that involve discounts, markups, commissions, and profit and compute simple and compound interest. | SE: pp. 64, 66–67 |
| **2.0 Students use exponents, powers, and roots and use exponents in working with fractions:** | |
| 2.1 Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base. | SE: pp. 6–7 |
| 2.2 Add and subtract fractions by using factoring to find common denominators. | |

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|---|---|
| 2.3 Multiply, divide, and simplify rational numbers by using exponent rules. | |
| 2.4 Use the inverse relationship between raising to a power and extracting the root of a perfect square integer; for an integer that is not square, determine without a calculator the two integers between which its square root lies and explain why. | |
| 2.5 Understand the meaning of the absolute value of a number; interpret the absolute value as the distance of the number from zero on a number line; and determine the absolute value of real numbers. | |
| **Algebra and Functions** | |
| **1.0 Students express quantitative relationships by using algebraic terminology, expressions, equations, inequalities, and graphs:** | |
| 1.1 Use variables and appropriate operations to write an expression, an equation, an inequality, or a system of equations or inequalities that represents a verbal description (e.g., three less than a number, half as large as area A). | SE: pp. 12–14, 16–19, 20–23, 24–27, 28–31, 32–35, 36–39, 60–63 |
| 1.2 Use the correct order of operations to evaluate algebraic expressions such as $3(2x + 5)^2$. | SE: pp. 8–11, 12–15 |
| 1.3 Simplify numerical expressions by applying properties of rational numbers (e.g., identity, inverse, distributive, associative, commutative) and justify the process used. | SE: pp. 12–15, 16–19, 20–23, 24–27, 32–35 |
| 1.4 Use algebraic terminology (e.g., variable, equation, term, coefficient, inequality, expression, constant) correctly. | SE: pp. 12, 28 |

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|---|---|---|
| | 1.5 Represent quantitative relationships graphically and interpret the meaning of a specific part of a graph in the situation represented by the graph. | SE: pp. 68–71, 76–79 |
| **2.0** | **Students interpret and evaluate expressions involving integer powers and simple roots:** | |
| | 2.1 Interpret positive whole-number powers as repeated multiplication and negative whole-number powers as repeated division or multiplication by the multiplicative inverse. Simplify and evaluate expressions that include exponents. | SE: pp. 4–7, 8–11, 14–15 |
| | 2.2 Multiply and divide monomials; extend the process of taking powers and extracting roots to monomials when the latter results in a monomial with an integer exponent. | SE: pp. 48–51 |
| **3.0** | **Students graph and interpret linear and some nonlinear functions:** | |
| | 3.1 Graph functions of the form $y = nx^2$ and $y = nx^3$ and use in solving problems. | |
| | 3.2 Plot the values from the volumes of three-dimensional shapes for various values on the edge lengths (e.g., cubes with varying edge lengths or a triangle prism with a fixed height and an equilateral triangle base of varying lengths). | |
| | 3.3 Graph linear functions, noting that the vertical change (change in $y$-value) per unit of horizontal change (change in $x$-value) is always the same and know that the ratio ("rise over run") is called the slope of a graph. | SE: pp. 68–69 |

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|---|---|
| 3.4 Plot the values of quantities whose ratios are always the same (e.g., cost to the number of an item, feet to inches, circumference to diameter of a circle). Fit a line to the plot and understand that the slope of the line equals the quantities. | SE: pp. 68–71, 76–79 |
| **4.0 Students solve simple linear equations and inequalities over the rational numbers:** | |
| 4.1 Solve two-step linear equations and inequalities in one variable over the rational numbers, interpret the solution or solutions in the context from which they arose, and verify the reasonableness of the results. | SE: pp. 28–31, 36–39 |
| 4.2 Solve multi-step problems involving rate, average speed, distance, and time or a direct variation. | SE: pp. 44–47, 68–69, 70 |
| **Measurement and Geometry** | |
| **1.0 Students choose appropriate units of measure and use ratios to convert within and between measurement systems to solve problems:** | |
| 1.1 Compare weights, capacities, geometric measures, times, and temperatures within and between measurement systems (e.g., miles per hour and feet per second, cubic inches to cubic centimeters). | SE: pp. 48–50 |
| 1.2 Construct and read drawings and models made to scale. | SE: pp. 52–55, 56–59 |
| 1.3 Use measures expressed as rates (e.g., speed, density) and measures expressed as products (e.g., person-days) to solve problems; check the units of the solutions; and use dimensional analysis to check the reasonableness of the answer. | SE: pp. 44–47 |

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|---|---|
| **2.0 Students compute the perimeter, area, and volume of common geometric objects and use the results to find measures of less common objects. They know how perimeter, area, and volume are affected by changes of scale:** | |
| 2.1 Use formulas routinely for finding the perimeter and area of basic two-dimensional figures and the surface area and volume of basic three-dimensional figures, including rectangles, parallelograms, trapezoids, squares, triangles, circles, prisms, and cylinders. | |
| 2.2 Estimate and compute the area of more complex or irregular two- and three-dimensional figures by breaking the figures down into more basic geometric objects. | |
| 2.3 Compute the length of the perimeter, the surface area of the faces, and the volume of a three-dimensional object built from rectangular solids. Understand that when the lengths of all dimensions are multiplied by a scale factor, the surface area is multiplied by the square of the scale factor and the volume is multiplied by the cube of the scale factor. | |
| 2.4 Relate the changes in measurement with a change of scale to the units used (e.g., square inches, cubic feet) and to conversions between units (1 square foot = 144 square inches or [$1ft^2$] = [144 $in^2$], 1 cubic inch is approximately 16.38 cubic centimeters or [1 $in^3$] = [16.38 $cm^3$]). | |

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|---|---|
| **3.0 Students know the Pythagorean Theorem and deepen their understanding of plane and solid geometric shapes by constructing figures that meet given conditions and by identifying attributes of figures:** | |
| 3.1 Identify and construct basic elements of geometric figures (e.g., altitudes, mid-points, diagonals, angle bisectors, and perpendicular bisectors; central angles, radii, diameters, and chords of circles) by using a compass and straightedge. | |
| 3.2 Understand and use coordinate graphs to plot simple figures, determine lengths and areas related to them, and determine their image under translations and reflections. | |
| 3.3 Know and understand the Phythagorean Theorem and its converse and use it to find the length of the missing side of a right triangle and the lengths of other line segments and, in some situations, empirically verify the Phythagorean Theorem by direct measurement. | |
| 3.4 Demonstrate an understanding of conditions that indicate two geometrical figures are congruent and what congruence means about the relationships between the sides and angles of the two figures. | |
| 3.5 Construct two-dimensional patterns for three-dimensional models, such as cylinders, prisms, and cones. | |
| 3.6 Identify elements of three-dimensional geometric objects (e.g., diagonals of rectangular solids) and describe how two or more objects are related in space (e.g., skew lines, the possible ways three planes might intersect). | |

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|---|---|
| **Statistics, Data, and Probability** | |
| **1.0 Students collect, organize, and represent data sets that have one or more variables and identify relationships among variables within a data set by hand and through the use of an electronic spreadsheet software program:** | |
| 1.1 Know various forms of display for data sets, including a stem-and-leaf plot or box-and-whisker plot; use the forms to display a single set of data or to compare two sets of data. | |
| 1.2 Represent two numerical variables on a scatter plot and informally describe how the data points are distributed and any apparent relationship that exists between the two variables (e.g., between time spent on homework and grade level). | |
| 1.3 Understand the meaning of, and be able to compute, the minimum, the lower quartile, the median, the upper quartile, and the maximum of a data set. | |
| **Mathematical Reasoning** | |
| **1.0 Students make decisions about how to approach problems:** | |
| 1.1 Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns. | SE: pp. 12–13, 16–17, 24–25, 40–41, 48–49, 52–53, 60–61 |
| 1.2 Formulate and justify mathematical conjectures based on a general description of the mathematical question or problem posed. | SE: pp. 4–5, 7, 32–33, 72–73 |
| 1.3 Determine when and how to break a problem into simpler parts. | SE: pp. 6–7, 8–9, 28–29, 36–37, 64–65 |

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|---|---|
| **2.0 Students use strategies, skills, and concepts in finding solutions:** | |
| 2.1 Use estimation to verify the reasonableness of calculated results. | |
| 2.2 Apply strategies and results from simpler problems to more complex problems. | SE: pp. 20–21, 44–45, 48–49, 52–53, 56–57, 60–61 |
| 2.3 Estimate unknown quantities graphically and solve for them by using logical reasoning and arithmetic and algebraic techniques. | SE: pp. 68–69, 70–71, 76–77, 78–79 |
| 2.4 Make and test conjectures by using both inductive and deductive reasoning. | SE: pp. 6–17, 72–73 |
| 2.5 Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning. | SE: pp. 52–53, 68–69, 76–77, 78–79 |
| 2.6 Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work. | SE: pp. 20–21, 68–69 |
| 2.7 Indicate the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy. | |
| 2.8 Make precise calculations and check the validity of the results from the context of the problem. | |
| **3.0 Students determine a solution is complete and move beyond a particular problem by generalizing to other situations:** | |
| 3.1 Evaluate the reasonableness of the solution in the context of the original situation. | |
| 3.2 Note the method of deriving the solution and demonstrate a conceptual understanding of the derivation by solving similar problems. | SE: pp. 6–7, 10–11, 14–15, 18–19, 22–23, 26–27, 30–31, 34–35, 38–39, 42–43, 46–47, 50–51, 54–55, 58–59, 62–63, 66–67, 70–71, 74–75, 78–79 |

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|---|---|
| 3.3 Develop generalizations of the results obtained and the strategies used and apply them to new problem situations. | SE: pp. 15, 19, 27, 35, 43, 51, 59, 67, 75 |

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| **Mathematics Content Standards**<br>**Algebra I** | | ***Write Math Answers to Open-Ended Questions in Algebra***<br>**New Readers Press** |
|---|---|---|
| **1.0** | Students identify and use the arithmetic properties of subsets of integers and rational, irrational, and real numbers, including closure properties for the four basic arithmetic operations where applicable: | |
| **1.1** | Students use properties of numbers to demonstrate whether assertions are true or false. | SE: pp. 4–7, 8–11, 12–15, 16–19 |
| **2.0** | Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root, and raising to a fractional power. They understand and use the rules of exponents. | |
| **3.0** | Students solve equations and inequalities involving absolute values. | |
| **4.0** | Students simplify expressions before solving linear equations and inequalities in one variable, such as $3(2x-5) + 4(x-2) = 12$. | SE: pp. 20–22, 23–27, 32–35 |
| **5.0** | Students solve multi-step problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step. | SE: pp. 4–7, 20–22, 28–31, 32–35 |
| **6.0** | Students graph a linear equation and compute the $x$- and $y$- intercepts (e.g., graph $2x + 6y = 4$). They are also able to sketch the region defined by linear inequality (e.g., they sketch the region defined by $2x + 6y < 4$). | SE: pp. 63, 64–67, 68–71 |
| **7.0** | Students verify that a point lines on a line, given an equation of the line. Students are able to derive linear equations by using the point-slope formula. | SE: pp. 60–63, 64–67 |

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| **Mathematics Content Standards**<br>**Algebra I** | | ***Write Math Answers to Open-Ended Questions in Algebra***<br>**New Readers Press** |
|---|---|---|
| **8.0** | Students understand the concepts of parallel lines and perpendicular lines and how those slopes are related. Students are able to find the equation of a line perpendicular to a given line that passes through a given point. | |
| **9.0** | Students solve a system of two linear equations in two variables algebraically and are able to interpret the answer graphically. Students are able to solve a system of two linear inequalities in two variables and to sketch the solution sets. | SE: pp. 76–79 |
| **10.0** | Students add, subtract, multiply, and divide monomials and polynomials. Students solve multi-step problems, including word problems, by using these techniques. | SE: pp. 32–35 |
| **11.0** | Students apply basic factoring techniques to second- and simple third-degree polynomials. These techniques include finding a common factor for all terms in a polynomial, recognizing the difference of two squares, and recognizing perfect squares of binomials. | |
| **12.0** | Students simplify fractions with polynomials in the numerator and denominator by factoring both and reducing them to the lowest terms. | |
| **13.0** | Students add, subtract, multiply, and divide rational expressions and functions. Students solve both computationally and conceptually challenging problems by using these techniques. | SE: pp. 12–15, 16–19 |
| **14.0** | Students solve a quadratic equation by factoring or completing the square. | |
| **15.0** | Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems. | SE: pp. 36–39, 40–43, 44–47, 48–51 |

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| **Mathematics Content Standards**<br>**Algebra I** | | ***Write Math Answers to Open-Ended Questions in Algebra***<br>**New Readers Press** |
|---|---|---|
| **16.0** | Students understand the concepts of a relation and a function, determine whether a given relation defines a function, and give pertinent information about given relations and functions. | SE: pp. 52–55, 56–59 |
| **17.0** | Students determine the domain of independent variables and the range of dependent variables defined by a graph, a set of ordered pairs, or a symbolic expression. | SE: pp. 32–35, 68–71 |
| **18.0** | Students determine whether a relation defined by a graph, a set of ordered pairs, or a symbolic expression is a function and justify the conclusion. | SE: pp. 52–55, 56–59 |
| **19.0** | Students know the quadratic formula and are familiar with its proof by completing the square. | |
| **20.0** | Students use the quadratic formula to find the roots of a second-degree polynomial and to solve quadratic equations. | |
| **21.0** | Students graph quadratic functions and know that their roots are the $x$- intercepts. | SE: pp. 72–75 |
| **22.0** | Students use the quadratic formula or factoring techniques or both to determine whether the graph of a quadratic function will intersect the x-axis in zero, one, or two points. | SE: pp. 72–75 |
| **23.0** | Students apply quadratic equations to physical problems, such as the motion of an object under the force of gravity. | |
| **24.0** | Students use and know simple aspects of a logical argument: | |
| | **24.1** Students explain the different between inductive and deductive reasoning and identify and provide examples of each. | |

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| Mathematics Content Standards<br>Algebra I | *Write Math Answers to Open-Ended Questions in Algebra*<br>New Readers Press |
|---|---|
| **24.2** Students identify the hypothesis and conclusion in logical deduction. | |
| **24.3** Students use counterexamples to show that an assertion is false and recognize that a single counterexample is sufficient to refute an assertion. | |
| **25.0** Students use properties of the number system to judge the validity of results, to justify each step of a procedure, and to prove or disprove statements: | |
| **25.1** Students use properties of numbers to construct simple, valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions. | SE: pp. 4–7, 12–15, 16–19 |
| **25.2** Students judge the validity of an argument according to whether the properties of the real number system and the order of operations have been applied correctly at each step. | SE: pp. 8–11 |
| **25.3** Given a specific algebraic statement involving linear, quadratic, or absolute value expressions or equations or inequalities, students determine whether the statement is true sometimes, always, or never. | |

| **Mathematics Content Standards**<br>**Algebra I** | | ***Write Math Answers to Open-Ended Questions in Algebra***<br>**New Readers Press** |
|---|---|---|
| **1.0** | Students identify and use the arithmetic properties of subsets of integers and rational, irrational, and real numbers, including closure properties for the four basic arithmetic operations where applicable: | |
| **1.1** | Students use properties of numbers to demonstrate whether assertions are true or false. | SE: pp. 4–7, 8–11, 16–19, 20–23, 72–75 |
| **2.0** | Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root, and raising to a fractional power. They understand and use the rules of exponents. | SE: pp. 16–19, 72–75 |
| **3.0** | Students solve equations and inequalities involving absolute values. | |
| **4.0** | Students simplify expressions before solving linear equations and inequalities in one variable, such as $3(2x-5) + 4(x-2) = 12$. | SE: pp. 8–11, 20–23 |
| **5.0** | Students solve multi-step problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step. | SE: pp. 12–15, 20–23, 24–27, 32–35, 48–51 |
| **6.0** | Students graph a linear equation and compute the $x$- and $y$- intercepts (e.g., graph $2x + 6y = 4$). They are also able to sketch the region defined by linear inequality (e.g., they sketch the region defined by $2x + 6y < 4$). | SE: pp. 24–27, 28–31, 32–35, 36–39, 48–51 |
| **7.0** | Students verify that a point lines on a line, given an equation of the line. Students are able to derive linear equations by using the point-slope formula. | SE: pp. 28–31, 36–39 |

SE = Student Edition

| **Mathematics Content Standards**<br>**Algebra I** | | ***Write Math Answers to Open-Ended Questions in Algebra***<br>**New Readers Press** |
|---|---|---|
| **8.0** | Students understand the concepts of parallel lines and perpendicular lines and how those slopes are related. Students are able to find the equation of a line perpendicular to a given line that passes through a given point. | SE: pp. 28–31 |
| **9.0** | Students solve a system of two linear equations in two variables algebraically and are able to interpret the answer graphically. Students are able to solve a system of two linear inequalities in two variables and to sketch the solution sets. | SE: pp. 52–55, 56–59 |
| **10.0** | Students add, subtract, multiply, and divide monomials and polynomials. Students solve multi-step problems, including word problems, by using these techniques. | SE: pp. 16–19, 64–67, 72–75 |
| **11.0** | Students apply basic factoring techniques to second- and simple third-degree polynomials. These techniques include finding a common factor for all terms in a polynomial, recognizing the difference of two squares, and recognizing perfect squares of binomials. | SE: pp. 60–63 |
| **12.0** | Students simplify fractions with polynomials in the numerator and denominator by factoring both and reducing them to the lowest terms. | SE: pp. 60–63, 76–79 |
| **13.0** | Students add, subtract, multiply, and divide rational expressions and functions. Students solve both computationally and conceptually challenging problems by using these techniques. | SE: pp. 4–7, 8–11, 12–15, 64–67, 68–71 |
| **14.0** | Students solve a quadratic equation by factoring or completing the square. | SE: pp. 60–63, 64–67, 68–71 |
| **15.0** | Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems. | SE: pp. 24–27, 28–31, 32–35, 44–47, 68–71 |

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| **Mathematics Content Standards**<br>**Algebra I** | ***Write Math Answers to Open-Ended Questions in Algebra***<br>**New Readers Press** |
|---|---|
| **16.0** Students understand the concepts of a relation and a function, determine whether a given relation defines a function, and give pertinent information about given relations and functions. | SE: pp. 40–43 |
| **17.0** Students determine the domain of independent variables and the range of dependent variables defined by a graph, a set of ordered pairs, or a symbolic expression. | SE: pp. 44–47 |
| **18.0** Students determine whether a relation defined by a graph, a set of ordered pairs, or a symbolic expression is a function and justify the conclusion. | SE: pp. 40–43, 44–47 |
| **19.0** Students know the quadratic formula and are familiar with its proof by completing the square. | SE: pp. 60–63 |
| **20.0** Students use the quadratic formula to find the roots of a second-degree polynomial and to solve quadratic equations. | SE: pp. 60–63 |
| **21.0** Students graph quadratic functions and know that their roots are the $x$- intercepts. | SE: pp. 64–67 |
| **22.0** Students use the quadratic formula or factoring techniques or both to determine whether the graph of a quadratic function will intersect the x-axis in zero, one, or two points. | SE: pp. 64–67 |
| **23.0** Students apply quadratic equations to physical problems, such as the motion of an object under the force of gravity. | SE: pp. 60–63, 64–67 |
| **24.0** Students use and know simple aspects of a logical argument: | |
| **24.1** Students explain the different between inductive and deductive reasoning and identify and provide examples of each. | |

SE = Student Edition

| Mathematics Content Standards<br>Algebra I | *Write Math Answers to Open-Ended Questions in Algebra*<br>New Readers Press |
|---|---|
| **24.2** Students identify the hypothesis and conclusion in logical deduction. | |
| **24.3** Students use counterexamples to show that an assertion is false and recognize that a single counterexample is sufficient to refute an assertion. | |
| **25.0** Students use properties of the number system to judge the validity of results, to justify each step of a procedure, and to prove or disprove statements: | |
| **25.1** Students use properties of numbers to construct simple, valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions. | SE: pp. 20–23 |
| **25.2** Students judge the validity of an argument according to whether the properties of the real number system and the order of operations have been applied correctly at each step. | SE: pp. 4–7 |
| **25.3** Given a specific algebraic statement involving linear, quadratic, or absolute value expressions or equations or inequalities, students determine whether the statement is true sometimes, always, or never. | SE: pp. 44–47 |

SE = Student Edition

| **Mathematics Content Standards**<br>**Algebra II** | | ***Write Math Answers to Open-Ended Questions in Algebra***<br>**New Readers Press** |
|---|---|---|
| **1.0** | Students solve equations and inequalities involving absolute value. | |
| **2.0** | Students solve systems of linear equations and inequalities (in two or three variables) by substitution, with graphs, or with matrices. | SE: pp. 52–55, 56–59 |
| **3.0** | Students are adept at operations on polynomials, including long division. | |
| **4.0** | Students factor polynomials representing the difference of squares, perfect square trinomials, and the sum and difference of two cubes. | |
| **5.0** | Students demonstrate knowledge of how real and complex numbers are related both arithmetically and graphically. In particular, they can plot complex numbers as points in the plane. | |
| **6.0** | Students add, subtract, multiply, and divide complex numbers. | |
| **7.0** | Students add, subtract, multiply, divide, reduce, and evaluate rational expressions with monomial and polynomial denominators and simplify complicated rational expressions, including those with negative exponents in the denominator. | SE: pp. 60–63, 76–79 |
| **8.0** | Students solve and graph quadratic equations by factoring, completing the square, or using the quadratic formula. Students apply these techniques in solving word problems. They also solve quadratic equations in the complex number system. | SE: pp. 60–63 |
| **9.0** | Students demonstrate and explain the effect that changing a coefficient has on the graph of quadratic functions; that is, students can determine how the graph of a parabola changes as *a, b,* and *c* vary in the equation $y = a(x-b)^2 + c$. | |

SE = Student Edition

| **Mathematics Content Standards**<br>**Algebra II** | ***Write Math Answers to Open-Ended Questions in Algebra***<br>**New Readers Press** |
|---|---|
| **10.0** Students graph quadratic functions and determine the maxima, minima, and zeros of the function. | SE: pp. 64–67 |
| **11.0** Students prove simple laws of logarithms. | |
| **11.1** Students understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents. | |
| **11.2** Students judge the validity of an argument according to whether the properties of real numbers, exponents, and logarithms have been applied correctly at each step. | |
| **12.0** Students know the laws of fractional exponents, understand exponential functions, and use these functions in problems involving exponential growth and decay. | |
| **13.0** Students use the definition of logarithms to translate between logarithms in any base. | |
| **14.0** Students understand and use the properties of logarithms to simplify logarithmic numeric expressions and to identify their approximate values. | |
| **15.0** Students determine whether a specific algebraic statement involving rational expressions, radical expressions, or logarithmic or exponential functions is sometimes true, always true, or never true. | |
| **16.0** Students demonstrate and explain how the geometry of the graph of a conic section (e.g., asymptotes, foci, eccentricity) depends on the coefficients of the quadratic equation representing it. | |

SE = Student Edition

| **Mathematics Content Standards**<br>**Algebra II** | | ***Write Math Answers to Open-Ended Questions in Algebra***<br>**New Readers Press** |
|---|---|---|
| **17.0** | Given a quadratic equation of the form $ax^2 + by^2 + cx + dy + e = 0$, students can use the method for completing the square to put the equation into standard form and can recognize whether the graph of the equation is a circle, ellipse, parabola, or hyperbola. Students can then graph the equation. | |
| **18.0** | Students use fundamental counting principles to compute combinations and permutations. | |
| **19.0** | Students use combinations and permutations to compute probabilities. | |
| **20.0** | Students know the binomial theorem and use it to expand binomial expressions that are raised to positive integer powers. | |
| **21.0** | Students apply the method of mathematical induction to prove general statements about the positive integers. | |
| **22.0** | Students find the general term and the sums of arithmetic series and of both finite and infinite geometric series. | |
| **23.0** | Students derive the summation formulas for arithmetic series and for both finite and infinite geometric series. | |
| **24.0** | Students solve problems involving functional concepts, such as composition, defining the inverse function and performing arithmetic operations on functions. | |
| **25.0** | Students use properties from number systems to justify steps in combining and simplifying functions. | |

| **Mathematics Content Standards**<br>**Algebra I** | | ***Write Math Answers to Open-Ended Questions in Algebra***<br>**New Readers Press** |
|---|---|---|
| **1.0** | Students identify and use the arithmetic properties of subsets of integers and rational, irrational, and real numbers, including closure properties for the four basic arithmetic operations where applicable: | |
| **1.1** | Students use properties of numbers to demonstrate whether assertions are true or false. | SE: pp. 4–7, 72–75 |
| **2.0** | Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root, and raising to a fractional power. They understand and use the rules of exponents. | SE: pp. 12–15 |
| **3.0** | Students solve equations and inequalities involving absolute values. | SE: pp. 36–39 |
| **4.0** | Students simplify expressions before solving linear equations and inequalities in one variable, such as $3(2x-5) + 4(x-2) = 12$. | SE: pp. 8–11 |
| **5.0** | Students solve multi-step problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step. | SE: pp. 8–11, 16–19 |
| **6.0** | Students graph a linear equation and compute the $x$- and $y$- intercepts (e.g., graph $2x + 6y = 4$). They are also able to sketch the region defined by linear inequality (e.g., they sketch the region defined by $2x + 6y < 4$). | SE: pp. 16–19, 20–23, 24–27, 28–31, 40–43 |
| **7.0** | Students verify that a point lines on a line, given an equation of the line. Students are able to derive linear equations by using the point-slope formula. | SE: pp. 32–35, 48–51 |

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| **Mathematics Content Standards**<br>**Algebra I** | | ***Write Math Answers to Open-Ended Questions in Algebra***<br>**New Readers Press** |
|---|---|---|
| **8.0** | Students understand the concepts of parallel lines and perpendicular lines and how those slopes are related. Students are able to find the equation of a line perpendicular to a given line that passes through a given point. | |
| **9.0** | Students solve a system of two linear equations in two variables algebraically and are able to interpret the answer graphically. Students are able to solve a system of two linear inequalities in two variables and to sketch the solution sets. | SE: pp. 52–55, 56–59 |
| **10.0** | Students add, subtract, multiply, and divide monomials and polynomials. Students solve multi-step problems, including word problems, by using these techniques. | SE: pp. 12–15, 64–67, 72–75 |
| **11.0** | Students apply basic factoring techniques to second- and simple third-degree polynomials. These techniques include finding a common factor for all terms in a polynomial, recognizing the difference of two squares, and recognizing perfect squares of binomials. | |
| **12.0** | Students simplify fractions with polynomials in the numerator and denominator by factoring both and reducing them to the lowest terms. | SE: pp. 60–63, 76–79 |
| **13.0** | Students add, subtract, multiply, and divide rational expressions and functions. Students solve both computationally and conceptually challenging problems by using these techniques. | SE: pp. 12–15, 72–75 |
| **14.0** | Students solve a quadratic equation by factoring or completing the square. | SE: pp. 60–63, 64–67, 68–71 |
| **15.0** | Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems. | SE: pp. 12–15, 24–27, 56–59 |

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| **Mathematics Content Standards**<br>**Algebra I** | ***Write Math Answers to Open-Ended Questions in Algebra***<br>**New Readers Press** |
|---|---|
| **16.0** Students understand the concepts of a relation and a function, determine whether a given relation defines a function, and give pertinent information about given relations and functions. | SE: pp. 44–47 |
| **17.0** Students determine the domain of independent variables and the range of dependent variables defined by a graph, a set of ordered pairs, or a symbolic expression. | SE: pp. 48–51 |
| **18.0** Students determine whether a relation defined by a graph, a set of ordered pairs, or a symbolic expression is a function and justify the conclusion. | SE: pp. 44–47 |
| **19.0** Students know the quadratic formula and are familiar with its proof by completing the square. | SE: pp. 64–67 |
| **20.0** Students use the quadratic formula to find the roots of a second-degree polynomial and to solve quadratic equations. | |
| **21.0** Students graph quadratic functions and know that their roots are the $x$- intercepts. | SE: pp. 64–67 |
| **22.0** Students use the quadratic formula or factoring techniques or both to determine whether the graph of a quadratic function will intersect the x-axis in zero, one, or two points. | SE: pp. 64–67 |
| **23.0** Students apply quadratic equations to physical problems, such as the motion of an object under the force of gravity. | SE: pp. 64–67 |
| **24.0** Students use and know simple aspects of a logical argument: | |
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| **25.0** Students use properties of the number system to judge the validity of results, to justify each step of a procedure, and to prove or disprove statements: | |
| **25.1** Students use properties of numbers to construct simple, valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions. | SE: pp. 48–51 |
| **25.2** Students judge the validity of an argument according to whether the properties of the real number system and the order of operations have been applied correctly at each step. | SE: pp. 4–7 |
| **25.3** Given a specific algebraic statement involving linear, quadratic, or absolute value expressions or equations or inequalities, students determine whether the statement is true sometimes, always, or never. | SE: pp. 36–39 |

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|---|---|---|
| **1.0** | Students solve equations and inequalities involving absolute value. | SE: pp. 36–39 |
| **2.0** | Students solve systems of linear equations and inequalities (in two or three variables) by substitution, with graphs, or with matrices. | SE: pp. 52–55, 56–59 |
| **3.0** | Students are adept at operations on polynomials, including long division. | |
| **4.0** | Students factor polynomials representing the difference of squares, perfect square trinomials, and the sum and difference of two cubes. | |
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| **6.0** | Students add, subtract, multiply, and divide complex numbers. | |
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| **8.0** | Students solve and graph quadratic equations by factoring, completing the square, or using the quadratic formula. Students apply these techniques in solving word problems. They also solve quadratic equations in the complex number system. | SE: pp. 60–63, 64–67 |
| **9.0** | Students demonstrate and explain the effect that changing a coefficient has on the graph of quadratic functions; that is, students can determine how the graph of a parabola changes as *a, b,* and *c* vary in the equation $y = a(x-b)^2 + c$. | |

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| **14.0** Students understand and use the properties of logarithms to simplify logarithmic numeric expressions and to identify their approximate values. | |
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|---|---|---|
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| **19.0** | Students use combinations and permutations to compute probabilities. | |
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| **23.0** | Students derive the summation formulas for arithmetic series and for both finite and infinite geometric series. | |
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