| Nebraska mathematics performance level descriptors |
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| Number & Quantity | Algebra | Functions | Geometry | Statistics & Probability |
| **DEVELOPING (1–17)** |
| * Perform one-operation computation with whole numbers and decimals
* Recognize equivalent fractions and fractions in lowest terms
* Identify a digit’s place value
* Locate rational numbers (expressed as integers, fractions, decimals, and mixed numbers) on the number line
* Recognize one-digit factors of a number
* Exhibit knowledge of elementary number concepts such as rounding, the ordering of decimals, and pattern identification
* Write positive powers of 10 by using exponents

*Note: A matrix as a representation of data is treated as a basic table (described in Statistics & Probability).* | * Solve problems in one or two steps using whole numbers and using decimals in the context of money
* Solve routine one-step arithmetic problems using positive rational numbers, such as single-step percent
* Solve routine two-step arithmetic problems with integers
* Relate a graph to a situation described qualitatively in terms of familiar properties such as before and after, increasing and decreasing, higher and lower
* Apply a definition of an operation for whole numbers (e.g., *a*  *b* = 3*a* – *b*)
 | * Perform common conversions of money and of length, weight, mass, and time within a measurement system (e.g., dollars to dimes, inches to feet, and hours to minutes)
* Estimate the length of a line segment based on other lengths in a geometric figure
* Calculate the length of a line segment based on the lengths of other line segments that go in the same direction (e.g., overlapping line segments and parallel sides of polygons with only right angles)
* Identify angle pairs associated with parallel lines (i.e., congruent or supplementary)
* Compute the perimeter of polygons when all side lengths are given
* Compute the area of rectangles when whole number dimensions are given
* Locate points in the first quadrant
 | * Calculate the average/mean of a list of numbers
* Calculate the average given the number of data values and the sum of the data values
* Read basic tables and charts
* Extract relevant data from a basic table or chart and use the data in a computation
* Use the relationship between the probability of an event and the probability of its complement
* Determine the probability of a simple event
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| * Exhibit knowledge of basic expressions (e.g., identify an expression for a total as *b* + *g*)
* Substitute whole numbers for unknown quantities to evaluate expressions
* Solve one-step equations to get integer or decimal answers
* Combine like terms (e.g., 2*x* + 5*x*)
 | * Extend a given pattern by a few terms for patterns that have a constant increase or decrease between terms
* Extend a given pattern by a few terms for patterns that have a constant factor between terms
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| **ON-TRACK (18–21)** |
| * Order fractions
* Exhibit knowledge of elementary number concepts such as primes and greatest common factor
* Comprehend the concept of length on the number line, and find the distance between two points
* Find the distance in the coordinate plane between two points with the same *x*‑coordinate or *y*‑coordinate
* Understand absolute value in terms of distance
* Add two matrices that have whole number entries
 | * Perform straightforward word-to-symbol translations
* Relate a graph to a situation described in terms of a starting value and an additional amount per unit (e.g., unit cost, weekly growth)
 | * Use properties of parallel lines to find the measure of an angle
* Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)
* Compute the area and perimeter of triangles and rectangles in simple problems
* Use geometric formulas when all necessary information is given
* Find the length of the hypotenuse of a right triangle when only very simple computation is involved (e.g., 3‑4‑5 and 6‑8‑10 triangles)
* Use symmetry of isosceles triangles to find unknown side lengths or angle measures
* Locate points in the coordinate plane
 | * Calculate the missing data value given the average and all data values but one
* Calculate the average/mean given the frequency counts of all the data values
* Translate from one representation of data to another (e.g., a bar graph to a circle graph)
* Describe events as combinations of other events (e.g., using *and*, *or*, and *not*)
* Exhibit knowledge of simple counting techniques
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| * Evaluate algebraic expressions by substituting integers for unknown quantities
* Add and subtract simple algebraic expressions
* Solve routine first-degree equations
* Solve first-degree inequalities when the method does not involve reversing the inequality sign
* Exhibit knowledge of slope/rate of change
* Multiply two binomials
* Match simple inequalities with their graphs on the number line (e.g., *x* ≥ –)
* Work problems involving positive integer exponents
 | * Evaluate linear, quadratic, and polynomial functions, expressed in function notation, at integer values
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*See the next page for descriptors associated with the ACT Benchmark performance level.*

| Nebraska mathematics performance level descriptors (continued) |
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| Number & Quantity | Algebra | Functions | Geometry | Statistics & Probability |
| **ACT BENCHMARK (22–36)** |
| * Find and use the least common multiple
* Work with numerical factors
* Apply number properties involving prime factorization
* Apply number properties involving even/odd numbers and factors/multiples
* Apply number properties involving positive/negative numbers
* Analyze and draw conclusions based on number concepts
* Apply properties of rational exponents
* Apply properties of rational numbers and the rational number system
* Apply the facts that is irrational and that the square root of an integer is rational only if that integer is a perfect square
* Apply properties of real numbers and the real number system, including properties of irrational numbers
* Exhibit some knowledge of the complex numbers
* Multiply two complex numbers
* Apply properties of complex numbers and the complex number system
* Use relations involving addition, subtraction, and scalar multiplication of vectors and of matrices
* Multiply matrices
* Apply properties of matrices and properties of matrices as a number system
 | * Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and estimating by using a given average value in place of actual values
* Solve multistep arithmetic problems that involve planning or converting common derived units of measure (e.g., feet per second to miles per hour)
* Solve word problems containing several rates, proportions, or percentages
* Solve complex arithmetic problems involving percent of increase or decrease or requiring integration of several concepts (e.g., using several ratios, comparing percentages, or comparing averages)
* Build functions and write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
* Build functions and write expressions, equations, and inequalities for common algebra settings (e.g., distance to a point on a curve and profit for variable cost and demand)
* Build functions and write expressions, equations, and inequalities when the process requires planning and/or strategic manipulation
* Match linear equations with their graphs in the coordinate plane
* Identify characteristics of graphs based on a set of conditions or on a general equation such as *y* = *ax*² + *c*
* Given an equation or function, find an equation or function whose graph is a translation by specified amounts in the horizontal and vertical directions
* Analyze and draw conclusions based on information from graphs in the coordinate plane
* Analyze and draw conclusions based on properties of algebra and/or functions
 | * Compute the perimeter of simple composite geometric figures with unknown side lengths
* Compute the area of triangles and rectangles when one or more additional simple steps are required
* Compute the area and circumference of circles after identifying necessary information
* Use relationships involving area, perimeter, and volume of geometric figures to compute another measure (e.g., surface area for a cube of a given volume and simple geometric probability)
* Recognize that real-world measurements are typically imprecise and that an appropriate level of precision is related to the measuring device and procedure
* Compute the area of composite geometric figures when planning and/or visualization is required
* Use scale factors to determine the magnitude of a size change
* Translate points up, down, left, and right in the coordinate plane
* Find the coordinates of a point rotated 90° or 180° around a given center point
* Apply the midpoint formula in context
* Find the coordinates of a point reflected across a vertical or horizontal line or across *y* = *x*
* Count the number of lines of symmetry of a geometric figure
* Given the length of two sides of a right triangle, find the third when the lengths are Pythagorean triples
* Use the Pythagorean theorem
* Use the distance formula
* Use several angle properties to find an unknown angle measure
* Solve multistep geometry problems that involve integrating concepts, planning, and/or visualization
* Apply properties of 30°‑60°‑90°, 45°‑45°‑90°, similar, and congruent triangles
* Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths
* Apply basic trigonometric ratios to solve right-triangle problems
* Determine the slope of a line from points or a graph
* Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point
* Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)
* Use relationships among angles, arcs, and distances in a circle
* Analyze and draw conclusions based on a set of conditions
 | * Manipulate data from tables and charts
* Analyze and draw conclusions based on information from tables and charts, including two-way frequency tables
* Distinguish between mean, median, and mode for a list of numbers
* Calculate or use a weighted average
* Use Venn diagrams in counting
* Apply counting techniques
* Compute straightforward probabilities for common situations
* Recognize the concept of independence expressed in real-world contexts
* Compute a probability when the event and/or sample space are not given or obvious
* Recognize that when data summaries are reported in the real world, results are often rounded and must be interpreted as having appropriate precision
* Recognize that when a statistical model is used, model values typically differ from actual values
* Understand the role of randomization in surveys, experiments, and observational studies
* Apply knowledge of conditional and joint probability, including in real-world contexts
* Recognize that part of the power of statistical modeling comes from looking at regularity in the differences between actual values and model values
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| * Recognize that when numerical quantities are reported in real-world contexts, the numbers are often rounded
* Work with squares and square roots of numbers
* Work with cubes and cube roots of numbers
* Work with scientific notation
* Solve real-world problems by using first-degree equations
* Determine the slope of a line from an equation
* Solve linear inequalities when the method involves reversing the inequality sign
* Match linear inequalities with their graphs on the number line
* Match compound inequalities with their graphs on the number line (e.g., –10.5 < *x* ≤ 20.3)
* Solve systems of two linear equations
* Solve absolute value equations
* Solve simple absolute value inequalities
* Add, subtract, and multiply polynomials
* Identify solutions to simple quadratic equations
* Solve quadratic equations given in factored form, such as (*x* + *a*)(*x* + *b*) = 0, where *a* and *b* are numbers or variables
* Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)
* Solve quadratic equations using factoring, quadratic formula, and completing the square
* Match simple quadratic inequalities with their graphs on the number line
* Manipulate expressions and equations
* Determine when an expression is undefined
* Apply the remainder theorem for polynomials, that *P*(*a*) is the remainder when *P*(*x*) is divided by (*x* – *a*)
 | * Build functions and use quantitative information to identify graphs for relations that are proportional or linear
* Relate a graph to a situation described qualitatively in terms of faster change or slower change
* Understand the concept of a function as having a well-defined output value at each valid input value
* Recognize the difference between a function modeling a situation and the reality of the situation
* Compare actual values and the values of a modeling function to judge model fit and compare models
* Understand the concept of domain and range in terms of valid input and output, and in terms of function graphs
* Find the domain and range of polynomial functions and rational functions
* Find where a rational function’s graph has a vertical asymptote
* Interpret statements that use function notation in terms of their context
* Use function notation for simple functions of two variables
* Build functions for relations that are inversely proportional or exponential
* Find the next term in a sequence described recursively
* Exhibit knowledge of geometric sequences
* Find a recursive expression for the general term in a sequence described recursively
* Exhibit knowledge of unit circle trigonometry
* Match graphs of basic trigonometric functions with their equations
* Use trigonometric concepts and basic identities to solve problems
* Exhibit knowledge of logarithms
* Evaluate composite functions at integer values
* Write an expression for the composite of two simple functions
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