| 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 |
| * 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 |
| **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 |
| * 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 |

*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 |
| * 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 |