NSCAS NEBRASKA STUDENT-CENTERED ASSESSMENT SYSTEM

Summative Assessment
Mathematics Grade 7 Range Achievement Level Descriptors

What are Range Achievement Level Descriptors?

Range Achievement Level Descriptors (ALDs) demonstrate how skills described in the Nebraska College and Career Ready Standards for Mathematics likely change and become more sophisticated as ability and performance increases. The ALDs also describe the evidence needed to help infer where a student is along the range. This range is defined by Nebraska using three levels:

- Developing – not yet demonstrating proficiency
- On Track – demonstrating proficiency
- Advanced– demonstrating advanced proficiency

The ALDs help show the within-standard reasoning complexity that increases in sophistication as the achievement levels increase. Such skill advancement is often related to increases in content difficulty, increases in reasoning complexity, and a reduction in the supports required for students to demonstrate what they know within a task or item.

The Range ALDs provide a way to communicate a progression that is visible and usable to all stakeholders, while also providing a foundation for a robust bank of assessment items that meets the needs of all Nebraska students.

How were the Nebraska's Mathematics Range ALDs updated for the new standards?

Draft Range ALDs for the new standards were created and reviewed by panels comprised of Nebraska educators during Spring of 2023. The updated ALDs were shared with NDE and their feedback was applied.

How will Nebraska's ELA Range ALDs change in relation to the new standards?

The updated ALDs were revised to reflect the new standards. The updated ALDs will be taken to the 2023 Item Writing Workshop where they will be used to help facilitate item writing. Feedback will be recorded at the upcoming Item Writing Workshop from Nebraska educators based on their use of the ALDs for writing items and at the upcoming standard setting from panelists. This feedback will then be used to update the ALDs. The updated ALDs will be shared with NDE to obtain their final recommendations.

NSCAS Mathematics
Grade 7 Range ALDs

Indicator	Developing learners do not yet demonstrate proficiency in the knowledge and skills necessary at this grade level, as specified in the assessed Nebraska College and Career Ready Standards. A developing learner…	On Track learners demonstrate proficiency in the knowledge and skills necessary at this grade level, as specified in the assessed Nebraska College and Career Ready Standards. An on-track learner…	Advanced Benchmark learners demonstrate advanced proficiency in the knowledge and skills necessary at this grade level, as specified in the assessed Nebraska Advanced Standards. A n advanced learner…
NUMBER: Students will solve problems and reason with number concepts using multiple representations, make connections within math and across disciplines, and communicate their ideas.			
7.N.1 Numeric Relationships: Students will demonstrate, represent, and show relationships among rational numbers within the base-ten number system. No additional indicator(s) at this level.			
7.N.2 Operations: Students will compute with rational numbers accurately.			
7.N.2.a Add, subtract, multiply, and divide rational numbers (e.g., positive and negative fractions, decimals, and integers).	Adds, subtracts, multiplies, and divides positive rational numbers, with an emphasis on working with fractions or mixed numbers together with decimals. DOK: 1 Multiplies integers. DOK: 1 Max DOK: 1	Adds and subtracts rational numbers where at least one value is negative (this could be the answer). DOK: 1 Divides a positive rational number and a negative rational number. DOK: 1 Evaluates a numerical expression involving two or more of the four operations with rational numbers. DOK: 1 Multiplies a positive rational number and a negative rational number. DOK: 1 Max DOK: 1	Explains or justifies a solution to a multi-step numerical expression using knowledge of the four operations with rational numbers. DOK: 3 Ex: Which operation(s) could be used in the expression such that the result is a negative number? Justify your answer. 4 - 7___7 * (-0.5) Compares two multi-step expressions with rational numbers using knowledge of the four operations (including order of operations). DOK: 2 Ex: 4 - 3(5) ____ 7 + 2(-6) Max DOK: 3
7.N.2.b Apply properties of operations (commutative, associative, distributive, identity, inverse, zero) as strategies for problem solving with rational numbers.	Assessed at the local level		
*RATIOS AND PROPORTIONS: Students will understand ratio concepts and use ratio reasoning to solve problems.			
7.R.1 Proportional Relationships: Students will understand the concept of proportions, use language to describe the relationship between two quantities, and use them to solve authentic situations.			
7.R.1.a Decide whether two quantities are in a proportional relationship (e.g., by testing for equivalent ratios in a table).	None at this level.	Determines whether quantities are in a proportional relationship given a table or description that does not show whether (0, 0) is included. Intervals may or may not be consecutive. DOK: 2 Determines whether quantities are in a proportional relationship given a table or description that includes (0, 0). DOK: 1 Determines whether a given equation represents a proportional relationship. DOK: 1 Max DOK: 2	Explains/justifies why quantities are or are not in a proportional relationship given a table or description. DOK: 2 Max DOK: 2

7.R.1.b Represent and solve authentic problems with proportions.	Determines or creates proportions to represent authentic situations, which involve benchmark fractions. Information may be presented in a graph. DOK: 2 Max DOK: 2	Determines the meaning of unknown variables in proportions based on the context of authentic situations. Information may be presented in a graph. DOK: 2 Determines or creates proportions to represent authentic situations, which involve fractions other than benchmark fractions. Information may be presented in a graph. DOK: 2 Max DOK: 2	Extrapolates or makes predictions about a proportional authentic situation based on an understanding of the proportion. Information may be presented in a graph. DOK: 2 Analyzes representations of authentic problems with proportions (e.g., explains why a proportion does or does not represent a given authentic problem). Information may be presented in a graph. DOK: 3 Max DOK: 3
7.R.1.c Use proportional relationships to solve authentic percent problems (e.g., percent change, sales tax, mark-up, discount, tip).	None at this level. (Refer to 6.R.1.e for solving authentic problems using ratios and unit rates that do not require proportions).	Uses proportional relationships to solve authentic problems involving two or more steps, including simple interest problems or problems involving application of percent change when given an initial value and either the percentage or final value. DOK: 2 Ex: A puppy's weight went from 8 pounds to 12 pounds. What was the percent change of the puppy's weight? Uses proportional relationships to solve authentic problems involving two or more steps related to one proportion, excluding percent change. DOK: 2 Use proportional relationships to solve authentic problems involving application of percent change when given the percent change and a final value. DOK: 2 Max DOK: 2	Uses proportional relationships to solve authentic problems involving two or more steps related to more than one proportion, excluding percent change. DOK: 2 Explains or justifies solutions to authentic problems involving proportional relationships. (e.g., Gus determined that the final cost would be $25. Is this true and why?) DOK: 3 Max DOK: 3
7.R.1.d Solve authentic problems involving scale drawings.	Solves authentic problems by determining the scale factor when given corresponding lengths for scale drawings. DOK: 2 Max DOK: 2	Solves authentic problems involving perimeter of a scale drawing. DOK: 2 Solves authentic problems by determining the scale factor when given corresponding dimensions, other than lengths, for scale drawings. DOK: 2 Solves authentic problems for the missing measures of a scale drawing using a given scale factor or other dimensions from the drawing. DOK: 2 Max DOK: 2	Solves authentic problems involving area and scale drawings. DOK: 2 Identifies needed information and solves authentic problems involving scale drawings using a proportional relationship. DOK: 2 Determines if two drawings within an authentic problem are drawn to scale given the lengths in the drawings. DOK: 2 Determines, justifies, and/or compares solution methods for solving authentic problems involving scale drawings. DOK: 3 Max DOK: 3
ALGEBRA: Students will solve problems and reason with algebra using multiple representations, make connections within math and across disciplines, and communicate their ideas.			
7.A.1 Algebraic Processes: Students will apply the operational properties when evaluating expressions, and solving equations and inequalities.			
7.A.1.a Use factoring and properties of operations to create equivalent algebraic expressions (e.g., 2x + 6 = 2(x + 3)).	Determines equivalent algebraic expressions using the properties of operations with all positive terms (e.g., 2x + 6 +5x = 6 + 2x + 5x). DOK: 1 Determines monomial numeric terms that can be factored from expressions. DOK: 1 Max DOK: 1	Determines monomial algebraic terms that can be factored from expressions with exponent of 1 but coefficient other than 1 (e.g., determine that 3x can be factored from all terms in an expression). DOK: 1 Determines or creates equivalent algebraic expressions using properties of operations with at least one negative term. DOK: 2 Determines or creates equivalent algebraic expressions using factoring. DOK: 2 Determines or creates equivalent algebraic expressions using factoring and properties of operations. Algebraic terms being factored are limited to monomials with exponent of 1. DOK: 2 Max DOK: 2	Determines monomial algebraic terms that can be factored from expressions with exponents other than 1 (e.g., determine that $3xy^2$ can be factored from all terms in an expression). DOK: 1 Determines or creates equivalent algebraic expressions using factoring and properties of operations. Algebraic terms being factored should have exponents other than 1. DOK: 2 Analyzes the use of the distributive property and/or properties of operations in creating equivalent algebraic expressions (e.g., explains why two algebraic expressions are or are not equivalent based on factoring and properties of operations). DOK: 3 Max DOK: 3

7.A.1.b Given the value of the variable(s), evaluate algebraic expressions which may include absolute value.	Evaluates single or multi-variable algebraic expressions without exponents or absolute values when given the value of the variable. May require operations on negative numbers, but the values of the variables should be limited to positive rational numbers. DOK: 1 Evaluates single or multi-variable algebraic expressions without exponents or absolute values when given the value of the variable. May require operations on negative numbers, but the values of the variables should be limited to integers. DOK: 1 Max DOK: 1	Evaluates single variable algebraic expressions, which may include exponents and/or absolute value, with at least one negative rational number when given the value of the variable. DOK: 1 Evaluates multi-variable algebraic expressions without exponents or absolute values when given the value of the variable. The values of the variables should include at least one negative rational number. DOK: 1 Max DOK: 1	Evaluates multi-variable algebraic expressions, which must include exponents and/or absolute value, when given the values of the variables. The values of the variables can be any rational number. DOK: 1 Analyzes the evaluation of single variable or multi-variable algebraic expressions, which may include exponents and/or absolute value when given value(s) of the variable(s) (e.g., explains why given values for the variables do or do not result in a specific evaluation for the algebraic expression). DOK: 3 Max DOK: 3
7.A.1.c Solve one- and two-step equations involving rational numbers.	Solves two-step equations with whole number coefficients for the variable (e.g., 5x-7 = 23). DOK: 1 Solves one-step equations with negative integer coefficients for the variable or have a solution that is a negative integer. DOK: 1 Max DOK: 1	Solves two-step equations with positive rational number coefficients for the variable (e.g., 2/3x - 7 = 2 1/3). DOK: 1 Determines or shows steps for solving two-step equations involving rational numbers which include the integers. DOK: 1 Solves one-step equations with negative rational number coefficients for the variable or have a solution that is a negative rational number. DOK: 1 Max DOK: 1	Solves two-step equations with negative rational number coefficients for the variable (e.g., 7 - 2x = 1 or 7 - 1/2x = 1). DOK: 1 Analyzes or justifies solutions to two-step equations involving rational numbers which include the integers (e.g., What error or errors where made when solving this equation?). DOK: 2 Max DOK: 2
7.A.1.d Solve equations using the distributive property and combining like terms.	Solves multi-step equations, with positive rational numbers, that involve combining like terms without the use of the distributive property when like terms are already on the same side of the equal sign. DOK: 2 Solves multi-step equations, with integers, that involve combining like terms without the use of the distributive property when like terms are already on the same side of the equal sign. DOK: 2 Variables should only be on one side of the equation. Max DOK: 2	Solves multi-step equations, with positive rational numbers, that involve combining like terms without the use of the distributive property when like terms are on different sides of the equal sign. DOK: 2 Solves equations, with positive rational numbers, that involve the distributive property and/or combining like terms. DOK: 2 Determines one or more steps necessary to solve multi-step equations with the distributive property and/or combining like terms. DOK: 2 Variables should only be on one side of the equation. Max DOK: 2	Analyzes solutions to multi-step equations, with positive rational numbers, using the distributive property and/or combining like terms (e.g., explains why using the distributive property and combining like terms does or does not result in a given simplified expression). DOK: 3 Variables should only be on one side of the equation. Max DOK: 3
7.A.1.e Solve one- and two-step inequalities involving integers and represent solutions on a number line.	Solves one or two-step inequalities involving integers. Variable coefficient should be positive. DOK: 1 Max DOK: 1	Solves one or two-step inequalities involving integers. DOK: 1 Solves one or two-step inequalities involving integers and represent the solutions on a number line. DOK: 2 Represents solutions on a number line for one or two-step inequalities involving addition or subtraction of integers. DOK: 2 Determines or creates one or two-step inequalities involving integers from representations of the solutions on a number line. DOK: 2 Max DOK: 2	Compares the solutions of one or two-step inequalities involving integers (e.g,, How do the solutions of -3x>2 differ from the solutions of 3x<2). DOK: 2 Explains or justifies solutions to one or two-step inequalities involving integers. DOK: 2 Explains or justifies representations of solutions on a number line for one or two-step inequalities involving integers. DOK: 2 Solves one or two-step inequalities with rational numbers and respresents the solutions on a number line. DOK: 2 Max DOK: 2
7.A.2 Applications: Students will solve authentic problems with algebraic expressions, equations, and inequalities.			
7.A.2.a Write one- and two-step equations involving rational numbers from words, tables, and authentic situations.	Determines what the unknown variable represents in a one or two-step equation from authentic situations involving rational numbers. DOK: 1 For one-step equations, must include at least one negative value. See 6.A.2.b for non-negative rationals Max DOK: 1	Determines one or two-step equations from words, tables, and authentic situations involving rational numbers in any form using addition, subtraction, multiplication, and/or division. DOK: 2 Max DOK: 2	Justifies why a given one or two-step equation does or does not represent a given problem from words, tables, and authentic situations. DOK: 2 Justifies whether or not a given equation matches a given problem from words, tables, and authentic situations. DOK: 3 Max DOK: 3

7.A.2.b Write one- and two-step inequalities to represent authentic situations involving integers.	Determines, describes, or creates one-variable one-step inequalities from tables (must include context). Integers only. DOK: 2 For one-step inequalities, must include at least one negative value. See 6.A.2.c for whole numbers Max DOK: 2	Determines, describes, or creates one-variable one- or two-step inequalities from word phrases, tables, or pictures (must include context). Integers only. DOK: 2 Max DOK: 2	Explains or justifies the creation of a one-variable one- or two-step inequality from a word phrase, table, or picture (must include context). Integers only. DOK: 3 Max DOK: 3
GEOMETRY: Students will solve problems and reason with geometry using multiple representations, make connections within math and across disciplines, and communicate their ideas.			
7.G.1 Attributes: Students will identify angle relationships and apply properties to determine angle measures.			
7.G.1.a Apply properties of adjacent, complementary, supplementary, linear pair, and vertical angles to find missing angle measures.	Identifies adjacent, complementary, supplementary, linear pair, and vertical angles based on a diagram without angle measures given. DOK: 1 Determines the missing angle measure when given a diagram involving linear pairs, vertical, adjacent, complementary, and/or supplementary angles with an unknown angle and at least one known angle measurement in degrees. DOK: 2 Max DOK: 2	Determines the unknown angle measurement when given one angle measurement in degrees and told the unknown angle is adjacent, complementary, supplementary, vertical, or linear pair, without a diagram. DOK: 2 Determines the value of the variable or the angle measurement of one or more angles when given angle measurements written as algebraic expressions or in terms of other angles (e.g., the measure of angle W is twice the measure of angle Z) when given a diagram involving linear pairs, vertical, adjacent, complementary, and/or supplementary angles. DOK: 2 Determines if two angles could be linear pairs, complementary, supplementary, and/or vertical angles when given two angle measurements. DOK: 1 Max DOK: 2	Determines the value of the variable or the angle measurement of one or more angles when given angle measurements written as algebraic expressions or in terms of other angles (e.g., the measure of angle W is twice the measure of angle Z) and told another angle is a linear pair, adjacent, complementary, supplementary, or vertical, without a diagram. DOK: 2 Explains or justifies why two angles could or could not be linear pairs, complementary, supplementary, and/or vertical angles when given two angle measurements. DOK: 3 Max DOK: 3
7.G.2 Coordinate Geometry: Students will determine location, orientation, and relationships on the coordinate plane.			
7.G.2.a Draw polygons in the coordinate plane given coordinates for the vertices.	Determines the name of the polygon drawn in the coordinate plane when provided the coordinates and a visual (This can include pentagons, hexagons, and octagons). DOK: 1 Determines the missing coordinates for one or two vertices to complete the drawing of one orientation of a polygon in the coordinate plane when provided the visual and points are on grid line intersections. (e.g. given two points on the coordinate plane, which ordered pair would form a particular type of triangle with the given points?) DOK: 2 Determines the coordinates of the vertices of a polygon in the coordinate plane when provided a visual and coordinates are on gridlines. DOK: 1 Polygons are limited to quadrilaterals and triangles. Max DOK: 2	Determines the name of the polygon in the coordinate plane when provided coordinates but no visual. DOK: 2 Determines the missing coordinates for one or two vertices to complete the drawing of one orientation of a polygon in the coordinate plane without a visual and coordinates are integers. DOK: 2 Determines the missing coordinates for one or two vertices to complete the drawing of one orientation of a polygon in the coordinate plane when provided the visual and at least one point is not on a grid line intersection. DOK: 2 Determines the coordinates of the vertices of a polygon in the coordinate plane when provided a visual and at least one coordinate is not on gridlines. DOK: 1 Polygons are limited to quadrilaterals and triangles. Max DOK: 2	Determines the missing coordinates for one or two vertices to complete the drawing of one orientation of a polygon in the coordinate plane without a visual when at least one point is not on a grid line intersection. DOK: 2 Determines the missing coordinates for one or more vertices to complete the drawing of more than one orientation of a polygon in the coordinate plane, with or without a visual. (e.g. given two points on the coordinate plane, determine all ordered pairs that would form a particular type of triangle with the given points?) DOK: 2 Determines the coordinates for the vertices of a polygon in the coordinate plane with a non-integer scale. DOK: 2 Polygons are limited to quadrilaterals and triangles. Max DOK: 2
7.G.2.b Calculate vertical and horizontal distances in the coordinate plane to find perimeter and area of rectangles.	Assessed at the local level		

7.G.3 Measurement: Students will identify geometric attributes that create two- and three-dimensional shapes in order to perform measurements and apply formulas to find area and volume.			
7.G.3.a Solve authentic problems involving perimeter and area of composite shapes made from triangles and quadrilaterals.	Solves authentic problems by determining perimeter and area of composite shapes made from triangles and rectangles when necessary dimensions are given. DOK: 2 Identifies process for calculating perimeter or area of composite shapes made from triangles and quadrilaterals in a authentic situation without having to carry out the process. DOK: 2 Max DOK: 2	Solves authentic problems by determining perimeter and area of composite shapes made from triangles and rectangles when one or more necessary dimensions is not directly given. DOK: 2 Solves authentic problems by determining perimeter and area of composite shapes made from triangles and quadrilaterals when necessary dimensions are given and at least one of the shapes is not a triangle or a rectangle. DOK: 2 Max DOK: 2	Solves authentic problems for missing dimensions when given the perimeter and/or area. DOK: 2 Solves authentic problems by determining perimeter and area of composite shapes made from triangles and quadrilaterals including solving for a missing dimension, when one or more necessary dimensions is not directly given and at least one of the shapes is not a triangle or a rectangle. May include justifying or analyzing the approach to the problem. DOK: 3 Solves authentic problems that require determining the perimeter or area of composite shapes made from triangles and quadrilaterals but which require further application after determining perimeter or area (e.g., use the perimeter to then calculate the cost of placing ribbon around a figure). The further application should be beyond calculating area/perimeter. May include justifying or analyzing the approach to the problem. DOK: 3 Max DOK: 3
7.G.3.b Determine surface area and volume of composite rectangular and triangular prisms.	Solves problems by determining the volume of composite shapes made from rectangular prisms when the division of rectangular prisms is explicitly given. DOK: 2 Max DOK: 2	Solves problems by determining the volume of composite shapes made from rectangular prisms when the division of rectangular prisms is not explicitly given. DOK: 2 Solves problems by determining the surface area of composite shapes made from rectangular and/or triangular prisms. DOK: 2 Solves problems by determining the volume of composite shapes made from at least one triangular prism and another prism (either triangular or rectangular). DOK: 2 Max DOK: 2	Solves problems that require determining the surface area or volume of shapes composed of rectangular, triangular, and/or other polygonal based prisms, but which require further application after determining surface area or volume (e.g., use the surface area to then calculate the cost of creating a figure). The further application should be beyond calculating surface area and volume. May include justifying or analyzing the approach to the problem. DOK: 3 Solves problems by determining a missing dimension when given the volume of composite shapes made from rectangular, triangular, and/or other polygonal based prisms. May include justifying or analyzing the approach to the problem. DOK: 3 If the base has 5 or more sides, then the area of the base must be given. Max DOK: 3
7.G.3.c Determine the area and circumference of circles both on and off the coordinate plane using 3.14 for the value of Pi.	Determines the radius of a circle when given the diameter or the diameter when given the radius. DOK: 1 Determines the radius and/or diameter of a circle drawn on the coordinate plane. DOK: 1 Max DOK: 1	Determines the area of a circle when given the radius or diameter. DOK: 1 Determines the circumference of a circle when given the radius or diameter. DOK: 1 Determines the diameter or radius when given the circumference of a circle. DOK: 1 Solves authentic problems involving the area and circumference of circles where the words "area" or "circumference" are referenced OR a diagram is provided. Does not include determining area given the circumference. Does not include determining radius, diameter, or circumference given the area. DOK: 2 Determines the area or circumference of a circle drawn on a coordinate plane, with the implied radius or diameter as a whole number that aligns with a horizontal or vertical grid line or halfway between grid lines. DOK: 2 Max DOK: 2	Identifies and justifies why an area or circumference does or does not match given information. DOK: 2 Determines the area of a circle when given the circumference. Includes authentic problems. DOK: 2 Determines the radius, diameter, or circumference when given the area of a circle. Area must be given in terms of pi and radius must be a whole number from 1 to 9. Includes authentic problems. DOK: 2 Solves authentic problems involving the area and circumference of circles where students must correlate area or circumference to the authentic situation without having those terms referenced in the item and without a diagram (e.g., distance around instead of circumference). DOK: 2 Max DOK: 2

DATA: Students will solve problems and reason with data/probability using multiple representations, make connections within math and across disciplines, and communicate their ideas.			
7.D.1 Data Collection & Statistical Methods: Students will formulate statistical investigative questions, collect data, and organize data.			
7.D.1.a Create an investigative question and collect data.	None at this level.	Determines questions that can be answered with data given a context. DOK: 2 Categorizes questions as those that can be addressed with data and those that cannot be addressed with data. DOK: 2 Max DOK: 2	Explains or justifies why a given question is or is not appropriate to collect data for a specific purpose. DOK: 3 Max DOK: 3
7.D.1.b Generate conclusions about a population based on a random sample.	Assessed at the local level		
7.D.1.c Identify and critique biases in various data representations.	Assessed at the local level		
7.D.2 Analyze Data and Interpret Results: Students will represent and analyze the data and interpret the results. No additional indicator(s) at this level.			
7.D.3 Probability: Students will interpret and apply concepts of probability.			
7.D.3.a Find theoretical and experimental probabilities for compound independent and dependent events.	Determines whether two events are independent, based on descriptions of the events, or provides a description of two independent events. DOK: 2 Determines whether two events are dependent, based on descriptions of the events, or provides a description of two dependent events. DOK: 2 Max DOK: 2	Determines the probability for two or more independent events given theoretical probabilities for each independent event. The probability may be written as a fraction, decimal, or percent. DOK: 1 Determines the probability for two or more independent events given information about the outcomes. The probability may be written as a fraction, decimal, or percent. DOK: 2 Ex: A bag contains 3 red marbles and 2 blue marbles. What is the probability of randomly drawing a red marble, putting it back in the bag, and randomly drawing another red marble? Determines the probability of a specific outcome given experimental probabilities for different independent events. The probability may be written as a fraction, decimal, or percent. DOK: 2 Determines the experimental probability of an independent event given information about different outcomes. The probability may be written as a fraction, decimal, or percent. DOK: 2 Determines the probability of dependent events when asked for the probability for one set of outcomes. The probability may be written as a fraction, decimal, or percent. DOK: 2 Ex: There are 5 green marbles, 4 red marbles, and 1 blue marble in a bag. What is the probability of drawing a green marble then a red marble without replacement? Max DOK: 2	Analyzes the calculation of the theoretical probability for independent events. Focus is on the theoretical probability concepts and not on calculation errors with fractions, decimals, or percents. DOK: 3 Ex: Explain why drawing two things from a bag with replacement will use the same denominator for each component (e.g., 3/5 x 1/5) while flipping a coin then rolling a number cube will use different denominators for each component (e.g., 1/2 x 1/6). Analyzes the calculation of experimental probability for independent events. Focus is on experimental probability concepts and not on calculation errors with fractions, decimals, or percent. DOK: 3 Ex: Explain why drawing two things from a bag without replacement will use different denominators and possibly different numerators for each component (e.g., 3/5 x 1/4) Determines the probability of dependent events when asked for the probability of two or more sets of outcomes. The probability may be written as a fraction, decimal, or percent. DOK: 2 Ex: There are 5 green marbles, 4 red marbles, and 1 blue marble in a bag. A marble is drawn from the bag. Then, without replacing the first marble, a second marble is drawn from the bag. Which two events result in a probability of 20/90? Explains or justifies the calculation of the probability of dependent compound events. DOK: 2 Max DOK: 3

7.D.3.b Identify complementary events and calculate their probabilities.	Determines whether a pair of outcomes are complementary when the outcomes are stated as p and not p (e.g., the probability of drawing a red card and the probability of not drawing a red card). DOK: 1 Determines the probability of a complementary event when the outcomes are stated as p and not p. The probability may be written as a fraction, decimal, or percent. DOK: 1 Max DOK: 1	Determines whether two sets of outcomes are complementary when each set includes two or more components (e.g., the probability of rolling 2 or 3 on a cube and the probability of rolling 1, 4, 5, or 6 on a cube). DOK: 1 Determines the probability of a complementary event when each set of outcomes include two or more components. The probability may be written as a fraction, decimal, or percent. DOK: 2 Max DOK: 2	Explains or justifies statements about complementary events or their probabilities. DOK: 2 Max DOK: 2