

## Summative Assessment Mathematics HS 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.

	Developing learners <u>do not yet demonstrate proficiency</u> in the knowledge	On Track learners <u>demonstrate proficiency</u> in the knowledge and skills	Advanced Benchmark lea
	Nebraska College and Career Ready Standards.	and Career Ready Standards.	assessed Nebraska Adva
Indicator			
	A developing learner	An on-track learner	An 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.			
US N 1 Estimation and Tachnology: Students will use			
Assimption strategies and technology. Students will use			
estimation strategies and technology to reason, to			
solve problems, and to make connections within			
mathematics and across disciplines.			<u> </u>
HS.N.1.a Select, apply, and explain the method of		Assessed at the local level	
computation when problem solving using real numbers			
(e.g., models, mental computation, paper-pencil,			
technology).			
	context. DOK: 1	values. DOK: 1	on the context. DOK: 1
HS.N.1.b Determine if the context of a problem calls		Mau DOK 1	Mary DOK: 1
for an approximation or an exact value.	Max DOK: 1	Max DOK: 1	Max DOK: 1
	None at this level.	Determines the rounding conventions to be used based on the context of a	Explains the rounding co
HS N 1 c Determine the rounding convention to be		problem. DOK. 1	problem. DOK: 1
used based on the context of a problem		Max DOK: 1	Max DOK: 1
	Compares a value given in radical or logarithmic form to another value in	Estimates values given in radical or logarithmic form to be between two	Explains why a value give
	the same form that can be simplified to an integer. DOK: 1	integer values. DOK: 1	integer values. DOK: 2
HS.N.1.d Estimate a value using the concept of			
betweenness by bounding above and below (e.g., since	Max DOK: 1	Orders a list of values given in radical or logarithmic form from least to greatest. DOK: 1	Max DOK: 2
log(10) = 1 and log(1,000) = 3 we know log(500) is		Breakest Bolk 1	
between 1 and 3).		Max DOK: 1	
	Identifies values that are within or outside of a tolerance interval. DOK: 1	Determines the tolerance intervals of measurements based on the measuring unit DOK: 1	Explains why there is an
	Max DOK: 1		Explains what values are
		Determines the percent errors of measurements based on the measuring	a measurement and why
HS.N.1.e Determine the tolerance interval and percent		unit. DOK: 1	Max DOK: 2
of error in measurement.		Max DOK: 1	WICK DOK. 2
	Determines equivalent rate measurements within one system of	Determines equivalent rate measurements within one system of	Determines equivalent ra
	measurement, metric or customary, where only one unit is converted (i.e.	measurement, metric or customary, where both units are converted (i.e.	or denominator) and at I
	numerator or denominator). May include context. May include multiple	numerator or denominator). May include context. May include multiple	context. May include mu
			Information for conversion
	Information for conversions must be provided in the item or on a reference	Determines equivalent rate measurements between two systems of	sheet.
	sheet.	measurement, metric and customary, where only one unit is converted (i.e.	
	Max DOK: 1	numerator or denominator). May include context. May include multiple	IVIAX DOK: 1
		Information for conversions must be provided in the item or on a reference	
HS.N.1.f Convert equivalent rates (e.g., miles per hour		sneet.	
to feet per second).		Max DOK: 1	

arners demonstrate advanced proficiency in the
essary at this grade level, as specified in the
nced Standards.
calls for an approximations or exact values based
nventions to be used based on the context of a
en in radical or logarithmic form is between two
arrar in massurament DOK: 2
error in measurement. DOK: 2
and the strength of the second television interval of
Possible given the value and tolerance interval of
. DUK: I
ate where both units are converted (i.e. numerator
east one is between two systems. May include
Itiple conversions within each unit. DOK: 1
ons must be provided in the item or on a reference

	Identifies a value or image from a calculator that is not reasonably	Determines whether extremely large or extremely small quantities can be	Explains why extremely la
HS.N.1.g Determine whether extremely large or	represented. DOK: 1	reasonably represented by a calculator or graphing utility. May include a context. DOK: 1	context. DOK: 1
extremely small quantities can be reasonably	Max DOK: 1		
represented by a calculator or graphing utility.		Max DOK: 1	Max DOK: 1
	None at this level.	Expresses estimates of very large or very small quantities using scientific notation given exact quantities . May include context. DOK: 1	Expresses how many time quantity when one or bot context. DOK: 2
		Adds, subtracts, multiplies, and/or divides expressions involving scientific notation. (Numbers may require conversion to scientific notation.) DOK: 1	Max DOK: 2
HS.N.1.h Use scientific notation to appropriately		Max DOK: 1	
represent large and small quantities.			
HS.N.2 Sets and Operations: Students will use number sets and operations to reason and to solve problems.			
	Identifies that an expression with an exponent of 1/2 or 1/3 is the same as square root or cube root, respectively. DOK: 1	Evaluates expressions involving rational exponents with denominators of 2 for perfect squares greater than or equal to 441 or less than zero. DOK: 2	Simplifies and evaluates denominators other than
	Simplifies and evaluates expressions with exponents of -1/2 for perfect squares less than or equal to 400 or exponents of -1/3 for perfect cubes from -125 to 125. May also include negative integer exponents of rational numbers. DOK: 1	Evaluates expressions involving rational exponents with denominators of 3 for perfect cubes greater than or equal to 216 or less than or equal to -216. DOK: 2	Analyzes the simplification exponents at the high sch Max DOK: 2
	Simplifies and evaluates expressions with positive or negative rational exponents greater than 1 or less than -1 with denominator of 2 for perfect squares less than or equal to 400. See grade 8 and below for integer exponents. DOK: 1	Simplifies and evaluates expressions with rational exponents with denominators of 2 or 3 for non-perfect square or cube roots. DOK: 2 Max DOK: 2	
	Simplifies and evaluates expressions with positive or negative rational exponents greater than 1 or less than -1 with denominator of 3 for perfect cubes from -125 to 125. See grade 8 and below for integer exponents. DOK:		
HS.N.2.a Extend the properties of exponents to			
rational numbers.	Max DOK: 1		
	Determines whether the sum of values are rational or irrational given that the values are rational or irrational. DOK: 1	Identifies values that have a sum which is rational or irrational. DOK: 1	Explains why the sum or that the values are ration
	Max DOK: 1	Determines whether the product of values are rational or irrational given	Max DOK: 2
		Max DOK: 1	
HS.N.2.b Use properties of rational and irrational numbers.			
	Determines sqrt(-1) is the imaginary unit i or that the square root of any negative number is imaginary. DOK: 1	Classifies complex numbers in the form a + bi as natural, whole, integer, rational, irrational, real, or imaginary. For real numbers, must include 0i.	Classifies powers of i into is an imaginary number o
	Determines the subset of numbers that a sum, difference, product, or quotient belongs to based on the sets of the numbers used in the operation when those numbers are natural, whole, integer, rational, irrational, or real. (e.g., when multiplying an integer by an irrational number, to which	Determines whether a sum, difference, product, or quotient is real or imaginary based on the sets of the numbers used in the operation. At least one value must be imaginary. (e.g., determines that the product could be	Analyzes the classificatio number is both real and o Max DOK: 2
HS N 2 c Demonstrate represent and show	subset will the product belong?) DOK: 1	real or imaginary when two imaginary numbers are multiplied together).	
relationships among the subsets of real numbers and		DOK: 1	
the complex number system.	IMAX DOK: T	Max DOK: 1	

ely large or extremely small quantities can or cannot ented by a calculator or graphing utility. May include a
times as large or small one quantity is than another both quantities are in scientific notation. May include
tes expressions involving rational exponents with han 2 or 3. DOK: 2
cation of numerical expressions involving rational n school level . DOK: 2
i or product of values are rational or irrational given tional or irrational (and non-zero). DOK: 2
into subsets of the complex number system. (e.g., i^5 er or i² is a real number/integer). DOK: 1
ation of complex numbers (e.g., explains how a real nd complex). DOK: 2

	Performs operations on real numbers (addition, subtraction, multiplication, division, integer exponents, and/or absolute value). Must include at least one of the following:	Performs operations on complex numbers where only one value is pure imaginary or in the form a + bi where a $\neq$ 0 and b $\neq$ 0. (e.g. 3(4 + 2i) = ?; i^5=?) DOK: 1	Performs operations on co form a + bi where a $\neq$ 0 and also in the form a + bi whe
	• Evaluating perfect squares greater than or equal to 441 or less than 0. Does not include rational exponents.	Performs operations on real numbers (addition, subtraction, multiplication, division, integer exponents, and/or absolute value). Must include at least one of the following:	Analyzes high school comp (e.g. explains why sqrt(2) +
	• Evaluating perfect cubes greater than or equal to 216 or less than or equal to -216. Does not include rational exponents.	• Evaluates perfect roots other than square roots and cube roots. Does not include rational exponents.	Max DOK: 2
	<ul> <li>Adds, subtracts, multiplies, and/or divides expressions involving square and/or cube roots other than those involving integer exponents as in MA 8.N.2.b. Does not include rational exponents.</li> </ul>	<ul> <li>Determines equivalent radical expressions for non-perfect roots other than square or cube roots. Does not include rational exponents.</li> </ul>	
HS.N.2.d Compute with subsets of the complex	• Determines equivalent radical expressions for non-perfect square or cube roots. Does not include rational exponents.	<ul> <li>Adds, subtracts, multiplies, and/or divides expressions involving a root other than a square root or cube root. Does not include rational exponents.</li> <li>DOK: 2</li> </ul>	
number system including imaginary, rational, irrational, integers, whole, and natural numbers.	Max DOK: 1	Max DOK: 1	
HS.N.3 Interpretation and Sense Making: Students will reason abstractly and quantitatively using units to solve problems and interpret results in context.			
HS.N.3.a Understand roundoff error and why roundoff error accumulates when rounding occurs prior to the last step in a computation.		Assessed at the local level	
	Determines whether proposed estimates or proposed processes for estimating addition, subtraction, multiplication, and division of rational numbers, the use of positive integer exponents, or the use of square roots or cube roots are reasonable using appropriate strategies and tools. (May include context.) DOK: 2	Determines whether proposed estimates or proposed processes for estimating for addition, subtraction, multiplication, and division of rational numbers and use of exponents and roots are reasonable using appropriate strategies and tools. (May include context.) Must include at least one square or cube root. DOK: 2	Explains whether proposed subtraction, multiplication exponents and roots are re (May include context.) DO
	Provides the best estimate using appropriate strategies and tools for a given problem involving rational numbers and the four operations and positive integer exponents (may include context). DOK: 2 Provides the best estimate using appropriate strategies and tools for a	Ex: Which value is the best estimate for 4xsqrt(26)+5.02? Provides the best estimate using appropriate strategies and tools for a given problem involving rational numbers, the four operations, exponents, and square or cube roots ( may include context). Must involve at least one	Ex: Why is the best estin Max DOK: 3
	given problem involving square or cube roots (may include context). DOK: 2 Ex: Which value is the best estimate for sqrt(26)?	e square or cube root in addition to another operation. DOK: 2 Ex: Which value is the best estimate for?	
HS.N.3.b Use estimation methods to check the reasonableness of real number computations and decide if the problem calls for an approximation	Max DOK: 2	Determines whether proposed estimates for solving problems involving two-step equations are reasonable using appropriate strategies and tools. DOK: 2	
(including appropriate rounding) or an exact number.		Max DOK: 2	
HS.N.3.c Use units to assess the validity of an answer in	Determines units that are needed or should result from single-step problems within a context. DOK: 1	Determines units that are needed or should result from multi-step problems within a context. DOK: 1	Explains why a solution is v DOK: 2
the context of a problem.	Max DOK: 1	Max DOK: 1	Max DOK: 2
HS.N.3.d Communicate the meaning of an answer in	Identifies an answer to a problem within a context that would have given meaning. DOK: 1	Determines the meaning of an answer in the context of a problem. DOK: 2 Max DOK: 2	Explains why an answer to DOK: 2
the context of a problem.	Max DOK: 1		Max DOK: 2

n complex numbers where at least one value is in the and $b \neq 0$ and another value is pure imaginary or where $a \neq 0$ and $b \neq 0$ . May include integer exponents ell. DOK: 2
omputations within the complex number system. (2) + sqrt(3) does not equal sqrt(5)) DOK: 2
osed rational number estimates for addition, tion, and division of rational numbers and use of re reasonable using appropriate strategies and tools. DOK: 3
stimate for?
i is valid using dimensional analysis within a context.
r to a problem within a context has a given meaning.

		-	
ALGEBRA: Students will solve problems and reason			
with algebra using multiple representations, make			
connections within math and across disciplines, and			
communicate their ideas.			
HS.A.1 Algebraic Relationships: Students will			
demonstrate and represent relationships with			
functions.			
HS.A.1.a Demonstrate that functions are a well			1
mapped subdomain of relations.		Assessed at the local level	
	Identifies or creates the definiton of a function. DOK: 1	Identifies a relation as a function given its equation. Equations are limited	Explains why a relation, p
	Coefficients and constants are rational numbers, and exponents are	to intear, quadratic, or absolute value equations. DOK. 1	DOK: 2
	integers.	Identifies a relation as a function given its graph, a table/list of ordered	
	May DOK: 1	pairs, or a mapping. DOK: 1	Coefficients and constant
	Max DOK. 1	Coefficients and constants are rational numbers, and exponents are	integers.
HS.A.1.b Analyze a relation to determine if it is a		integers.	Max DOK: 2
function given mapping diagrams, function notation		Max DOK: 1	
(e.g., $f(x)=x^2$ ), a table, or a graph.		Max DOK. 1	
	Determines which functions are linear and nonlinear functions from their	Determines which functions are linear and nonlinear functions from	Explains why a function is
	graphs and/or equations. DOK: 1	tables/list of ordered pairs or mapping. DOK: 1	table/list of ordered pairs
	Determines which functions are linear and quadratic functions from their	Determines which functions are linear, quadratic, absolute value, and	Coefficients and constant
	graphs and/or equations. Does not require distinguishing quadratic from	exponential from tables/list of ordered pairs or mapping. DOK: 1	integers.
	other non-linear functions. DOK: 1	Determines which functions are linear, guadratic, absolute value, and	Does not require knowing
	Coefficients and constants are rational numbers, and exponents are	exponential from their graphs and/or equations. DOK: 1	Max DOK: 2
	integers.		
	Does not require knowing the names of other non-linear functions.	Explains why a function is linear given a table/list of ordered pairs or mapping. DOK: 2	
	Max DOK: 1		
		Explains why a function is quadratic, absolute value, or exponential given	
		its graph or equation. DOK: 2	
		Explains why a function is linear given its graph or equation. DOK: 1	
		Coefficients and constants are rational numbers, and exponents are	
		integers.	
HS.A.1.c Classify a function given its mapping diagram,		bes not require knowing the names of other norminear functions.	
function notation, table, or graph as a linear,		Max DOK: 2	
quadratic, absolute value, exponential, or other			
function.			
	Determines the domain and range of a function from its graph. DOK: 1	Determines the range of a quadratic or absolute value function from its	Analyzes the domain and
	Determines the domain and range of a linear function from its equation.	equation. Dok. 2	the range is only all real n
	DOK: 1	Determines if a function is has an inverse (i.e. is one-to-one) given a graph	
	Determines the domain of a guadratic or absolute value function from its	or equation. DOK: 2	Explains why a function m
	equation. DOK: 1	Coefficients and constants are rational numbers, and exponents are	mapping of the function.
		integers.	Coefficients and constant
	Determines the general definition of an inverse function. DOK: 1	Max DOK: 2	integers.
	Coefficients and constants are rational numbers, and exponents are		Max DOK: 2
HS.A.1.d Analyze a function's domain and range to	integers.		
determine if it is one-to-one and has an inverse	Max DOK: 1		
function both algebraically and graphically.			

presented in any format, is or is not a function.
linear, quadratic, or absolute value equations.
ts are rational numbers, and exponents are
s quadratic, absolute value, or exponential given a
s or mapping. DOK: 2
ts are rational numbers, and exponents are
g the names of other non-linear functions.
d range of a given linear, quadratic, or absolute
hy is the domain of $f(x) = x^2$ all real numbers but
numbers greater than or equal to zero?) DOK: 2
may or may not have an inverse given a table or
. DOK: 2
ts are rational numbers, and exponents are

	Determines the graph of a linear function given the slope and y-intercept or	Compares intercepts and slope/rate of change for two different functions.	Interprets the meaning
	given both intercepts. DOK: 1	Functions may be provided in similar formats or in different formats. DOK:	(Euroctions include lines
	Determines which functions are absolute value functions given graphs of	2	functions.) DOK: 2
	functions. DOK: 1	Determines the vertex, maximum, minimum, intercepts, and line of	,
		symmetry of an absolute value function or quadratic function given its	Max DOK: 2
	Determines the vertex, maximum, minimum, intercepts, and line of	equation. DOK: 2	
	symmetry of an absolute value function or quadratic function given its	Determines the intercents and asymptotes of an exponential function given	
HS A 1 e Define, interpret, and analyze linear.	graph of table of values. Dok. 1	its equation, DOK: 2	1
quadratic absolute value and exponential functions	Determines the intercepts and asymptotes of an exponential function given		
using the points of interest of the functions and	its graph or table of values. DOK: 1	Max DOK: 2	
using the points of interest of the functions and			
graphing technology.	Max DOK: 1		
	identifies the type of transformation to an existing function given the	Determines the vertical and/or norizontal translation of a function given the equation of the parent original function and the new function in vertex	Determines the effect o
	exponential.) DOK: 1	form and vice versa. (Functions can include linear, quadratic, absolute	and vice versa. (Functio
		value, and exponential.) DOK: 2	exponential.) DOK: 2
	Max DOK: 1		
		Determines the effect of the coefficient on a function	Max DOK: 2
		new function and vice versa. (What is the transformation on $f(x)$ = abs(x) to	
		g(x) = -2abs(x)?) May not include translations. (Functions can include linear,	,
		quadratic, absolute value, and exponential.) DOK: 2	
		Mau DOK 2	
HS.A.1.f Identify, analyze, and apply transformations of		Max DOK: 2	
existing functions (including translation and dilation).			
	Identifies that the inverse of an exponential is a logarithm and vice versa.	Determines the exponential equation that is equivalent to a given	Solves a logarithmic equ
	(Does not require generating an equation.) DOK: 1	logarithmic equation and vice versa. DOK: 2	first. DOK: 2
	Identify the inverse of an exponential from a graph. DOK: 1	Max DOK: 2	Max DOK: 2
HS.A.1.g Interpret logarithmic equations as exponential			
equations.	Max DOK: 1		
	Identifies a sequence as being arithmetic given a table of values or	Determines the equation or word phrase that describes an arithmetic	Explains why a sequenc
	equation. (Equations can be explicit or recursive.) DOK: 2	sequence given a list or table of values. (Equations can be explicit or	equation. DOK: 2
	Max DOK: 2	recursive.) DOK. 2	Converts an equation of
		Determines the word phrase that describes an arithmetic sequence given	recursive form. DOK: 2
		an equation. (Equations can be explicit or recursive.) DOK: 2	
			Max DOK: 2
HS.A.1.h Describe arithmetic sequences using tables of		Max DOK: 2	
values and functions in explicit and recursive forms.			
	Identifies a sequence as being geometric given a table of values or	Determines the equation or word phrase that describes a geometric	Explains why a sequence
	equation. (Equations can be explicit of recursive.) DOK. 2	recursive.) DOK: 2	equation. DOK. 2
	Max DOK: 2		Converts an equation of
		Determines the word phrase that describes a geometric sequence given an	recursive form. DOK: 2
		equation. (Equations can be explicit or recursive.) DOK: 2	
HS.A.1.i Describe geometric sequences using tables of		Max DOK: 2	IVIDX DUK: Z
values and functions in explicit and recursive forms.			
HS.A.2 Algebraic Processes: Students will apply the			
operational properties when evaluating rational			
expressions and solving linear and quadratic equations			
and inequalities			
and mequanties.			

of the slope, vertex, maximum, minimum, netry, or asymptote of a function within a context. ar, quadratic, absolute value, and exponential of the coefficient and a horizontal and/or vertical n given the parent function and the new function ons can include linear, quadratic, absolute value, and uation that requires converting to an exponential ce is or is not arithmetic given a table of values or f an arithmetic sequence between it's explicit and ce is or is not geometric given a table of values or of a geometric sequence between it's explicit and

	Determines the solution from the graph given the graph of a system of linear equations in two variables. DOK: 1	Solves a system of linear equations in two variables given a table of values and/or equations when all variables have coefficients other than 1 or 0. DOK: 2	Analyzes solutions to sys variables with or withou
	Determines the sector of a graph that represents the solution to a system of inequalities. DOK: 1	Determines a graph that represents a given system of linear inequalities in	Ex: With the given restai
	Solves a system of linear equations in two variables given a table of values and/or equations when at least one variable has a coefficient of 1 or 0.	two variables. DOK: 2 Determines that when a system of linear equations has infinitely many	Ex: Explain why (2, 40) is Solves a system of linear
	DUK: 2 Determines when systems of linear equations have no solution or infinitely	Determines when systems of linear inequalities have no solution or	DOK: 2
	many solutions. DOK: 1	infinitely many solutions. DOK: 2	Max DOK: 2
	See 8.A.1.a for identifying when one-variable equations have no solution or infinitely many.	Explains the method or steps of solving equations, inequalities, systems of linear equations, systems of linear inequalities, or contextual equations. (This may involve explaining single or multiple steps). DOK: 2	
HS.A.2.a Analyze and explain the properties used in	All linear systems should be two variables.	All linear systems should be two variables.	
solving equations, inequalities, systems of linear	Max DOK: 2		
equations, systems of linear inequalities, and literal		Max DOK: 2	
equations.			
	Determines the slope-intercept form of an equation given a different form. DOK: 2	Determines the vertex form of a quadratic equation given an alternate form. DOK: 2	Explains how the quantit of a given context or just
	Max DOK: 2	Determines the factored form of a quadratic equation given an alternate form. DOK: 2	Max DOK: 2
HS.A.2.b Generate expressions in equivalent forms by		Determines an equivalent expression based on a specific need in the given	
using algebraic properties to make different		Context. DOK: 2	
characteristics or features visible.		Max DOK: 2	
	Identifies properties of equality/inequality/operations when used in isolation, (e.g., Which property of equality is represented by $a + b = b + a$ ?)	Identifies multiple properties of equality/inequality/operations. DOK: 1	Writes an algebraic proo inequality, DOK: 2
	DOK: 1	Writes an equation using a named property or writes the property given the equation. DOK: 2	Max DOK: 2
	Max DUK: 1	Completes an algebraic proof when solving a linear or quadratic equation or linear inequality, given a partially completed proof. DOK: 2	
		Identifies the algebraic proof for a given linear or quadratic equation or linear inequality. DOK: 1	
HS.A.2.c Analyze equations and inequalities to		Max DOK: 2	
determine and apply efficient methods to solve and			
	Determines the slope of a line given the graph. DOK: 1	Determines the slope of a line given two points on the line or a table of values. DOK: 2	None at this level.
HS.A.2.d Calculate the slope (rate of change) of a line	Max DOK: 1		
given coordinate points, a graph, or a table of values.		Max DOK: 2	
	Determines the graph of a linear function (including constant functions) or vertical line given the equation in any form and vice versa. Proportional relationships must use function notation. Otherwise, see grade 8, DOK: 1	Determines the equation of a line given the slope/rate of change and points that are non-intercepts for the linear function. DOK: 2	Identifies the graph of an equation and vice versa.
	Determines the equation of a line given the slope/rate of change and an intercent of the linear function. DOK: 1	Determines the equation of a line given points on the line. Points can be ordered pairs, data in table, or points in graph. DOK: 2	Writes the piece-wise ec graph. DOK: 2
	Identifies the graph of an absolute value function or exponential function given its equation and vice versa. DOK: 1	Writes the absolute value equation, quadratic equation, or exponential equation for a function given its given its graph or table. DOK: 2	Max DOK: 2
	Identifies the graph of a quadratic function given its equation in vertex form and vice versa. DOK: 1	Identifies the graph of a quadratic function given its equation in standard form and vice versa. DOK: 2	
HS.A.2.e Write and graph equations of functions		Max DOK: 2	
(linear, absolute value, quadratic, and exponential)	Max DOK: 1		
using the points of interest of the function.			

tems of linear equations and inequalities in two ta context. DOK: 2
nts, are Patti's estimates feasible?
or is not a solution to the system.
equations in three variables given a table of value all variables have coefficients other than 1 or 0.
ies in equivalent expressions are related in terms ifies the form used. DOK: 2
f for a given linear or quadratic equation or linear
DOK: 2
uation for an absolute value function given its

	Determines the slope of parallel lines given the equation, two points on one line, or graph of one line. DOK: 2	Determines the slopes of perpendicular lines given the equation, two points on one line, or graph of one line. DOK: 2	Determines the equation whose equation is not pr
	Determines the graph of a line parallel or perpendicular to a given line whose graph provided. DOK: 1	Determines the equation or graph of a line perpendicular to a given line whose equation is provided. DOK: 2	Max DOK: 2
	Max DOK: 2	Determines the equation or graph of a line parallel to a given line whose equation provided. DOK: 1	
HS.A.2.1 Given a line, write the equation of a line that is		May DOV: 2	
	Adds or subtracts polynomial expressions with one variable. DOK: 1	Adds or subtracts polynomial expressions with more than one variable	Explains the steps taken
		DOK: 1	polynomial expressions.
	Multiplies mononomial and binomial expressions. DOK: 1	Multiplice active mich engenerations (a site as the old he managements) DOV 2	
	Divides a binomial by a mononomial expression. DOK: 1	Factors polynomial expression. DOK: 2	Max DOK: 2
	Max DOK: 1		
HS.A.2.g Perform and explain operations such as		Divides quadratic polynomial by a binomial. (Should not require remainders) DOK: 2	
addition, subtraction, multiplication, division, and		Max DOK: 2	
factoring on polynomials.			
	Determines the real or imaginary zeros of a quadratic equation given the equation in factored form equal to zero. DOK: 1	Determines the corresponding factored form of a quadratic equation or a polynomial of degree 3 or higher equal to zero given its real or imaginary zeros. DOK: 1	Analyzes an explainatior to the zeros of a polynor
	Determines the zeros of the equation when given a polynomial equation of		Max DOK: 2
	degree 3 or higher in factored form equal to zero. DOK: 1	Explains how the factors of a polynomial are related to the zeros of a	
HS.A.2.h Explain the connection between the factors of	Max DOK: 1	polynomial. DOK: 2	
a polynomial and the zeros of a polynomial.		Max DOK: 2	
	Adds functions with rational coefficients and integer exponents and determines the sum's corresponding domain. DOK: 2	Composes two functions with rational coefficients and integer exponents and determines the composition's corresponding domain. Does not require division by a non-constant function. DOK: 2	Composes functions with requires division of a nor composition's correspon
	Subtracts functions with rational coefficients and integer exponents and determines the difference's corresponding domain. DOK: 2	Multiplies functions with rational coefficients and integer exponents and determines the product's corresponding domain. DOK: 2	Composes functions with
	Functions are limited to linear, quadratic, and absolute value.	acternines the product's corresponding domain. Box. 2	and determines the new
		Divides functions with rational coefficients and integer exponents and	Functions are limited to
	Max DOK: 2	determines the quotient's corresponding domain when there is no remainder. DOK: 2	Max DOK: 2
		Functions are limited to linear, quadratic, and absolute value.	
HS.A.2.1 Combine functions by composition and		Max DOK: 2	
perform operations on functions.			
HS.A.3 Applications: Students will solve authentic			
problems using nonlinear functions.	Medals authoritic problems that can be called with linear equations or	Models multi-stap authoratic problems that can be colued with equations or	Models authoptic proble
	inequalities involving real numbers in any form. DOK: 2	inequalities involving real numbers in any form when at least one of the	linear), exponential, or s
		steps involves raising numbers to a rational exponent or operations on	features of graphs. DOK
	Max DOK: 2	irrational numbers. DOK: 2	Analyzes solutions to au
		Models authentic problems involving systems of linear equations or inequalities, quadratic, or absolute value functions. May include	inequalities, systems of functions. DOK: 3
HS.A.3.a Analyze and model authentic situations using		Interpreting their graphs in context. DOK: 2	Max DOK: 3
various representations and appropriate technology.		Max DOK: 2	110A DON. 3

n of a line perpendicular or parallel to a given line rovided. DOK: 2 to add, subtract, multiply, divide, or factor DOK: 2 n about how the factors of a polynomial are related mial. DOK: 2 h rational coefficients and integer exponents that n-constant function and determines the nding domain. DOK: 2 n irrational coefficients and/or rational exponents v function's corresponding domain. DOK: 2 linear, quadratic, and absolute value. ems involving polynomial (non-quadratic, non-

equare root functions. Does not require analyzing : 2

thentic problems involving linear equations, linear equations, quadratic, or absolute value

	Identifies polynomials that have a given number of real roots and degree. (The value of the roots should not be given). DOK: 1	Identifies the roots of a polynomial given the equation in factored form. DOK: 1	Interprets the meaning of context. DOK: 2
	Max DOK: 1	Identifies the equation of a polynomial in factored form given the graph. DOK: 1	Explains why the degree
		Identifies the number of real and imaginary roots of a polynomial given the equation in factored form. DOK: 1	Max DOK: 2
		Identifies the number of real and imaginary roots of a polynomial given the graph and degree DOK: 1	
		Identifies graphs of polynomials given the factors, x-intercepts, roots, or zeros. DOK: 1	
HS.A.3.b Identify, interpret, relate, and graph the factors, x-intercepts, roots, and zeros of polynomial		Identifies the maximum number of real roots of a polynomial given the degree. DOK: 1	
runctions using algebraic and graphing methods.		Max DOK: 1	
	Identifies and appropriate domain and/or range given the context of a problem. DOK: 2	Identifies contexts that are represented by a given domain and or range. DOK: 2	Explains why certain solur given the context of a pro
	Identifies the graph of a function that best matched the context of a problem (based on domain and range). DOK: 2	Determines the domain and/or range of a function based on the context. DOK: 2	Max DOK: 2
	Max DOK: 2	Determines which values of a function are appropriate solutions within a context (value could be given as coordinates or real/imaginary roots). DOK: 2	
HS.A.3.c Identify and predict appropriate solutions to equations given context and domain/range (e.g., extraneous solutions, imaginary solutions, no solution,		Identifies the number of appropriate solutions of a function given the context and the graph and/or equation. (no solution, finite solutions, infinite solutions, etc.) DOK: 2	
infinitely many solutions).		Max DOK: 2	
GEOMETRY: Students will solve problems and reason with geometry using multiple representations, make connections within math and across disciplines, and communicate their ideas.			
TOOLS: Students will sketch, draw, and construct appropriate representations using a variety of tools and methods which may include ruler/straight edge, protractor, compass, reflective devices, paper folding, or dynamic geometric software.			
HS.G.1 Attributes: Students will identify and describe geometric attributes, apply properties and theorems, and create two-dimensional shapes.			
	Names which types of transformations preserve congruence or similarity. DOK: 1	Determines congruence or similarity of two or more figures on or off the coordinate plane when shown multiple figures with required side measures labeled. DOK: 1	Determines congruence of coordinate plan when sho lengths are labeled. Side
		Determines if the image and pre-image are congruent or similar when given a single or series of transformations. DOK: 2	Explains or justifies why a
		Max DOK: 2	
HS.G.1.a Demonstrate that two figures are similar or			Ex: Explain why two diffe image results in different
dilations that map a figure onto the other in problems			Max DOK: 3

g of the zeros of a polynomial equations given the
ee of a polynomial limits the number of roots. DOK: 2
olutions or portions of a graph are not reasonable
problem. DOK: 2
ce or similarity of two or more figures on or off the shown multiple figures and not all required side de lengths can be determined based on information gram. DOK: 2
hy a series of transformations does or does not or similarity. DOK: 3
ifferent sets of transformations on the same pre-

ent images.

	Identifies a line of symmetry as a line of reflection. DOK: 1	Identifies which reflections and/or rotations will map a figure onto itself with or without coordinates. DOK: 1	Determines possible figure to itself.
HS.G.1.b Describe symmetries of a figure in terms of	Identifies a point of symmetry as a center of rotation. DOK: 1		
informations that map a figure onto itself and make	Max DOK: 1	Determines missing sides or angles of a figure given that the figure is symmetric. DOK: 1	Max DOK: 2
side lengths or angle measures) in problems both with			
and without coordinates		Max DOK: 1	
HS G 1 c Explain how the criteria for triangle	Identifies congruent or similar triangles based on ASA. SAS. AAS. SSS.	Explains how the criteria for triangle congruence or similarity (ASA, SAS,	Analyzes explanations h
congruence and similarity (ASA_SAS_AAS_and SSS	and/or AA. DOK: 2	AAS, SSS, and/or AA) follow from the definition of congruence and	(ASA, SAS, AAS, SSS, and
congruence: AA similarity criterion) follow from the	Max DOK- 2	similarity in terms of corresponding parts. DOK: 3	and similarity in terms of
definition of congruence and similarity in terms of	Wax DON. 2	Max DOK: 3	Max DOK: 3
corresponding parts.			
	None at this level.	Applies the Pythagorean Theorem in mathematical and authentic problems	Applies the Pythagorea
		when the answer is in simplified radical form. DOK: 2	in three-dimensions. DO
	See 8.G.3.b	Refer to 8.G.3.b for applying the Pythagorean Theorem to find side lengths	Max DOK: 2
		of triangles, determine if a triangle is a right triangle, and to solve authentic	
		problems when the answer is not in simplified radical form.	
HS G 1 d Identify and apply right triangle relationships		Max DOK: 2	
including converse of the Pythagorean Theorem			
	Determines when a triangle is 30-60-90 or 45-45-90 when given 3 side	Determines lengths of missing sides when given one side and one angle in a	a Determines a missing va
	lengths in radical form. DOK: 1	special right triangle. DOK: 2	special triangles given a
	Max DOK: 1	Completes a special right triangle pattern when given two sides of a right	Max DOK: 2
		triangle. For example: given that the leg of a right triangle measures 4 and	
US C 1 a Apply side and apple relationships of special		the hypotenuse measures 8, determine that the angle opposite 4 is 30	
right triangles (20 degree C0 degree 00 degree and 45		degrees and the missing side is 4 sq rt 3 with the angle opposite it measuring 60 degrees. Side lengths are given in radical form if appropriate.	
degree 4E degree 00 degree by degree 40 degree and 45		DOK: 2	
degree-45 degree-90 degree) to solve geometric			
	Identifies the definitions of sine, cosine, and tangent, DOK: 1	Max DUK: 2 Solves for sides of a right triangle that requires using sine, cosine, and/or	Solves authentic problem
		tangent. No context. DOK: 2	include quadrilaterals a
	Identifies the equation for sine, cosine, and tangent (e.g., $sin (x) = 5/13$ ).	May DOV: 2	Coluce mothermotical or
	DOK. 1	IVIAX DON. 2	tangent when solving for
	Max DOK: 1		quadrilaterals and cong
			Determines the relation
			given one or more of th
			the value of cos (x)). DO
			Max DOK: 2
HS.G.1.f Identify and apply right triangle relationships			
including sine, cosine, and tangent.	Determines the interior or outerior angle of a triangle with or without a	Determines the interior or outerior angle of an place with or without a	Solvos a multi stan prob
	context. DOK: 1	context. DOK: 2	or exterior angle formul
	Max DOK: 1	Determines the number of side of an n-gon given the interior or external angles. DOK: 2	Max DOK: 2
HS.G.1.g Apply interior and exterior angle formulas for			
n-gons and apply to authentic situations.		Max DOK: 2	
	Identifies which quadrilaterals have given properties. DOK: 1	Compares and/or contrasts the properties of quadrilaterals:	None at this level.
HS G 1 h Compare/contrast the properties of	Max DOK: 1	trapezoids. DOK: 2	
auadrilatorals: parallolograms, roctangles, rhembi			
quarinaterials, parametograms, recidingles, monipulation,		Max DOK: 2	
squares, kites, trapezolus, and isosceles trapezolds.			

gures given a description of the rigid motions that . DOK: 2 how the criteria for triangle congruence or similarity d/or AA) follow from the definition of congruence of corresponding parts. DOK: 3 n Theorem in mathematical and authentic problems OK: 2 ariable in a problem that involves multiple uses of a figure. DOK: 2 ems requiring sine, cosine, and/or tangent. May nd congruent or similar triangles. DOK: 2 authentic problems requiring sine, cosine, and/or or a missing angle measurement. May include gruent or similar triangles. DOK: 2 nship between sine, cosine, and/or tangent when e values (e.g., given the value of sin (x), determine DK: 2 lems where one of the steps involves the interior la with or without a context. DOK: 2

	None at this level.	Given coordinates that represent a quadrilateral, determines whether it is a square, rectangle, or parallelogram. DOK: 2	Given coordinates that r trapezoid, isosceles trap
	Refer to 8.G.3.b-c for applying the Pythagorean Theorem to find side lengths of triangles, determine if a triangle is a right triangle, and to solve authentic problems.	Given that a quadrilateral is a square, rectangle, or parallelogram, determines a third and/or fourth point given at least two points that make up the quadrilateral. DOK: 2	Given that a quadrilatera kite, determines a third make up the quadrilater
		Max DOK: 2	Reminder: NDE uses the parallel sides).
HS.G.1.i Use slope and the distance formula to determine the type of quadrilateral.			Max DOK: 2
	Determines the arc length given the circumference of a circle and the central angle. DOK: 2	Determines measures of angles and arc lengths related to a circle that require the application of central angles, inscribed angles, and external angles formed by intersecting secants, intersecting tangents, or a secant	Determines measures of require application of an
	Determines the area of a sector given the area of the circle and the central angle. DOK: 2	and a tangent. DOK: 2 Determines the arc length when either the circumference or the central	Determines the arc leng angle has to be determin
HS.G.1.j Identify, describe, apply, and reason through	Max DOK: 2	angle has to be determined from other given information. DOK: 2	Determines the area of a has to be determined fro
properties of central angles, inscribed angles, angles formed by intersecting chords, secants, and/or		has to be determined from other given information. DOK: 2	Max DOK: 2
tangents to find the measures of angles related to the circle, arc lengths, and areas of sectors.		Max DOK: 2	
HS.G.2 Attributes: Students will identify and describe geometric attributes, apply properties and theorems and create three-dimensional shapes.			
	Converts between units for volume within the same system. DOK: 2	Converts between units for volume across the two systems. DOK: 2	Solves authenic problem
HS.G.2.a Convert between various units of volume (e.g., cubic feet to cubic yards).	Max DOK: 2	Max DOK: 2	Max DOK: 2
HS.G.2.b Apply the effect of a scale factor to determine the volume of similar three-dimensional shapes and solids	Determines the scale factor between volume for similar solids when given only the scale factor between corresponding lengths of the shapes or solids. Volume cannot be determined from given values in the problem to then determine scale factor. May include context. (e.g. The scale factor between the length of the base between solid A and solid B is 0.5. What value can the volume of solid A be multiplied by to determine the volume of solid B?) DOK: 2 Max DOK: 2	Determines the volume of a similar solid given the volume of the original solid and the scale factor between corresponding lengths of the solids. May include context. DOK: 2 Max DOK: 2	Determines the volume solid and the scale facto must be determined. Inf factor is needed to deter Max DOK: 2
	Determines volume of right pyramids without the need for trigonometry beyond the Pythagorean Theorem. May include context. DOK: 2 Max DOK: 2	Determines surface area of pyramids, as well as solids that are composites of pyramids, prisms, spheres, cylinders, and cones where areas can be determined without the need for trigonometry beyond the Pythagorean Theorem or application of angles/special segments related to circles. May include context. DOK: 2 Determines an unknown dimension of a pyramid when given the volume and another dimension (may include context). DOK: 2	Determines surface area of pyramids, prisms, sph tangent or application of include context. DOK: 2 Determines the volume of pyramids, prisms, sph tangent or application of include context. DOK: 2
HS.G.2.c Determine surface area and volume of pyramids, as well as solids that are composites of pyramids, prisms, spheres, cylinders, and cones, using formulas and appropriate units.		Compares volumes or surface areas of right pyramids and/or composite shapes. DOK: 2 Max DOK: 2	Max DOK: 2
HS.G.3 Coordinate Geometry and Transformations: Students will demonstrate and represent location, orientation, and relationships on the coordinate plane.			

epresent a quadrilateral, determines whether it is a ezoid, rhombus, or kite. DOK: 2
I is a trapezoid, isosceles trapezoid, rhombus, or and/or fourth point given at least two points that al. DOK: 2
exclusive definition of a trapezoid (exactly 1 pair of
angles and arc lengths related to a circle that gles formed by two chords. DOK: 2
h when both the circumference and the central ed from other given information. DOK: 2
sector when both the area and the central angle m other given information. DOK: 2
s that require only the conversion between units o systems. DOK: 2
of a similar solid given the volume of the original between corresponding lengths of the shapes ormation should be limited such that the scale
mine volume. May include context. DOK: 2
of pyramids, as well as solids that are composites
eres, cylinders that require use of sine, cosine, or angles/special segments related to circles. May
of pyramids, as well as solids that are composites eres, cylinders that require use of sine, cosine, or
angles/special segments related to circles. May

HS.G.3.a Derive the midpoint formula using the concept of average and apply the midpoint formula to find coordinates.	Determines the midpoint between two points on the coordinate plane given the ordered pairs of the points between which the midpoint lies. May be shown with or without the coordinate plane. May include context. DOK: 2 Derivation is locally assessed. Max DOK: 2	Given the midpoint between two points on the coordinate plane and one of the ordered pairs of the points between which the midpoint lies, determines the other ordered pair. May be shown with or without the coordinate plane. May include context. (e.g., Given that (1,1) is the midpoint between (-1,-1) and (x,y), what is (x,y)?) DOK: 2 Max DOK: 2	Applies the midpoint for endpoints of the diamet DOK: 2 Max DOK: 2
HS.G.3.b Find the images and preimages of transformations of a point, shape, or a relation on the coordinate plane. Transformations include the following and their compositions: reflections across horizontal and vertical lines and the lines y=x and y=-x, rotations about the origin of 90 degrees, dilations about the origin by any positive scale factor, and any translation.	Determines the image of a point, shape, or a relation on the coordinate plane after a single transformation given the preimage. DOK: 2 Determines the preimage of a point, shape, or a relation on the coordinate plane after a single transformation given the image. DOK: 2 Max DOK: 2	Determines the image of a point, shape, or a relation on the coordinate plane after a series of transformations given the preimage. DOK: 2 Determines the preimage of a point, shape, or a relation on the coordinate plane after a series of transformations given the image. DOK: 2 Max DOK: 2	Determines the image o coordinate plane after a is given in algebraic nota Max DOK: 2
HS.G.3.c Find the equation of a circle given the radius and the center.	Determines the equation of a circle given its radius or diameter and center at the origin or given a diagram or graph where radius can be read from the diagram/graph. DOK: 1 Identifies the graph of a circle given its equation in standard form, e.g., $(x - h)^2 + (y - k)^2 = r^2$ . DOK: 1 Determines the radius and/or the coordinates of the center of a circle given its equation in standard form. DOK: 1 Max DOK: 1	Determines the equation of a circle given its radius or diameter and center not at the origin or given a diagram or graph where radius can be read from the diagram/graph. DOK: 1 Determines the equation of a circle given its center and its area or circumference. DOK: 2 Determines the equation of a circle given its center and a point on the circle. DOK: 2 Determines a point on the circle when the equation of the circle is not	Identifies the graph of a x <sup>2</sup> + y <sup>2</sup> + 2ax + 2by + c = 0 Determines the x- or y-c coordinate, its radius or Determines the radius a its equation in non-stand Max DOK: 2
HS.G.4 Logic and Proof: Students will use geometric definitions and theorems to reason abstractly and quantitatively.			
HS.G.4.a Know and use definitions to make deductions in mathematical argumentation (e.g., syllogism, detachment).	Identifies basic mathematical statements as being true or false. DOK: 1 Max DOK: 1	Identifies logical conclusions given a basic mathematical statement. DOK: 2 Max DOK: 2	Identifies logical conclus statements. DOK: 2 Max DOK: 2
HS.G.4.b Evaluate the validity of conditional statements, including biconditional statements (e.g., conditional, converse, contrapositive, inverse).	Identifies the converse, contrapositive, or inverse statement when given a conditional statement or vice versa. DOK: 1 Max DOK: 1	Determines the validity of a conditional or biconditional statement. DOK: 2 Determines the validity of converse, contrapositive, inverse statements when given a conditional or biconditional statement. DOK: 2 Max DOK: 2	Explains the general vali conditional statements. always be true?) DOK: 2 Max DOK: 2
HS.G.4.c Evaluate the validity of an argument communicated in different ways (e.g., a flow format, two-column, paragraph format).	Identifies an argument in one form when given in another form. DOK: 1 Max DOK: 1	Determines the validity of an argument. DOK: 2 Max DOK: 2	None at this level.
HS.G.4.d Use coordinate geometry to prove triangles are right, acute, obtuse, isosceles, equilateral, or scalene.	None at this level. Refer to 8.G.3.b-c for applying the Pythagorean Theorem to find side lengths of triangles, determines if a triangle is a right triangle, and to solve authentic problems.	Given coordinates that represent a triangle, determines whether the triangle is isosceles, equilateral, or scalene. DOK: 2 Max DOK: 2	Given coordinates that r triangle is acute or obtu: Given that a triangle is is point given two points th Max DOK: 2

rmula to other geometric figures. (e.g., given the ter of a circle, what is the center of the circle?). r preimage of a point, shape, or a relation on the series of transformations when the transformation ation. DOK: 2 circle given its equation in non-standard form, e.g., ). DOK: 2 coordinate of the center of a circle given the other diameter, and a point on the circle. DOK: 2 nd/or the coordinates of the center of a circle given dard form. DOK: 2 sions given multiple basic mathematical idity of statements in relations to other types of (e.g. If a statement is true, will the contrapositive epresent a triangle, determines whether the se. DOK: 2 sosceles, equilateral, or scalene, determines a third hat make up the triangle. DOK: 2

S5.6.4 Prove and apply geometric properties and theorems, regarding triangles, congruence, and possible properties and optimized to be apply geometric to be apply geometric properties and theorems, regarding triangles, congruence, and possible properties and optimized to be apply geometric to be apply geometric to be apply geometric to be apply appl				
Na DDC1       consistence of the set brought comparet tranger, one protect of tranger,		Identifies theorems related to triangles, congruent triangles, and similar triangles when used in isolation. DOK: 1	Identifies multiple theorems in use when related triangles, congruent triangles, and similar triangles when used in isolation. DOK: 2	Writes a geometric proo similar triangles. DOK: 2
HS 6.4. Prove and apply geometric properties and similarity using deductive reasoning.       Institute transmiss DOS 1 acrOBS 2       Institute transmiss DOS 1 beometry and transmiss DOS 1 acrOBS 2       Institute transmiss DOS 1 beometry and transmiss DOS 1 acrOBS 2       Institute transmiss DOS 1 beometry and transmiss DOS 1 acrOBS 2       Institute transmiss DOS 1 beometry and transmiss DOS 1 acrOBS 2       Institute transmiss DOS 1 beometry and		Max DOK: 1	Completes a geometric proof related to triangles, congruent triangles, and similar triangles when given a partially completed proof. DOK: 2	Max DOK: 2
HS, G. & J. Prove and apply geometric properties and similarity using deductive reasoning.       Man D00: 2       Man D00: 2         HS, G. & J. Prove and apply geometric theorems related to apartiterias who used in salation. D00: 1       destified multiple theorems regarding theorems related to apartiterias who used in salation. D00: 2       Man D00: 2         HS, G. & J. Prove and apply geometric theorems about quadrilaterias using deductive reasoning.       Man D00: 1       Man D00: 1       Man D00: 1         ATA: Students will supplementation, multiple representation, multiple representat			Identifies the geometric proof related to triangles, congruent triangles, and similar triangles. DOK: 1	
Interfaces     Interfaces     Interfaces     Interfaces       Interfaces     Interfa	HS.G.4.e Prove and apply geometric properties and		Max DOK: 2	
Aministry using deductive reasoning. Wentifie theorems eladed to quadifiate als when used in isolation, DCL 1 Gendrifies age on effect of the set of the s	theorems regarding triangles, congruence, and		Wax DON. 2	
And DDC: 2 controls DDC 2 co	similarity using deductive reasoning.			14/-1
Max DOI: 3     Complete a generative and related to quadrilaterials when given a partially requested for 0.02.2     Max DOI: 3       HS G. AF Prove and apply geometric theorems about quadrilaterials using deductive reasoning.     Max DOI: 3     Complete a generative and related to quadrilaterials. DOI: 1       Max DDI: 2     Max DDI: 3     Max DDI: 3     Max DDI: 3       Addary for bability using multiple representations, make data probability using the data probability of the data probabili		Identifies theorems related to quadrilaterals when used in isolation. DOK: 1	Identifies multiple theorems in use when related quadrilaterals when used in isolation. DOK: 2	Writes a geometric proo
HS 6.4 Prove and apply geometric theorems about       Additional system       Additional system         HS 6.4 Prove and apply geometric theorems about       Additional system       Additional system       Additional system         DATA: Students will solve problems and reason with data/probability using multiple representations, made connections with math and across disciplines, and connecting with remarks with geometric provide an answer.       Assessed at the local level         HS D.1.1 bar Collection and Statistical Methods:       Students will formulate multi-variable statistical methods:       Assessed at the local level         HS D.1.1 bar phy on appropriate data collection plan when collecting primary data for the statistical method is used. Bolt is a distributed at for analyse.       Statistical formulate multi-variable statistical methods.         HS D.1.1 bar phy on appropriate data collection plan when collecting primary data for the statistical methods.       Statistical formulate data for analyse.       Assessed at the local level         HS D.1.1 bar phy on appropriate data constitution with a constitution of mathomatical survey, experiment, and an observational stude. Bolt is and constitution of appalation, amage and endor		Max DOK: 1		Max DOK: 2
HS.G.A.F Prove and apply geometric theorems about quadrilaterals. DOI: 1 At SG.A.F Prove and apply geometric theorems about quadrilaterals. DOI: 2 At A. Students will solve problems and reason with dara/probability using multiple representations, make connections within math and across disciplines, and connections with the folders. Students will formulate statistical investigative questions and determine how data can be collected and analyzed to provide an answer. HS.D.1 ab formulate multi-variable statistical investigative questions and determine how data can be collected and analyzed to provide an answer. HS.D.1 by Apply an appropriate data collection plan when collecting primary data for the statistical investigative question of interest. HS.D.1 by Apply an appropriate data collection plan when collecting primary data for the statistical investigative question of interest. HS.D.1 by Apply and proprime technology, including generatives. BDC 1 and and across. BDC 1 when a definitions of randomad survey, exerciments, and determines the definitions of randomad survey, exerciments, and determines the definitions of randomad survey, exerciments, and determines the definitions of pratomad survey, an experiment, and and before survey, an experiment, and an observational studies. BDC 1 during across and experiments are prepared with constitutes good practice in deta for analyses of bias and confounding wrote experiments, and deta for analyses of bias and confounding wrote experiments and economical survey and potentiate in the constat of a population, samples and randoma surges, bolt of the strate of an across of the survey and confinent wrote action of			Completes a geometric proof related to quadrilaterals when given a partially completed proof. DOK: 2	
HS, G.A. Prove and apply geometric theorems about quadritaters using deductive reasoning.       Mix DOC 2         DATA: Students will solve problems and reason with data/probability using multiple representations, make connections within math and across disciplines, and communicate their relations.       Mix DOC 2         MS, D.J. Data Collection and Statistical Methods: Students will rowestigative questions, collect data, and organize data.       Image: Collection and Statistical Methods: Students will rowestigative questions, and determine how data can be collected and analyzed to provide an answer.       Assessed at the local level         MSD.D. Log Day an appropriate data collection plan when collecting primary data for the statistical investigative questions of the statistical investigative questions of networks and determine how data can be collected and an analyzed.       Assessed at the local level         MSD.D. Log Day appropriate data for analyzis.       Assessed at the local level       evaluation of interest.         MSD.D. Log Day appropriate data for analyzis.       Assessed at the local level       evaluation of analyzis.         MSD.D. Log Day appropriate data for analyzis.       Assessed at the local level       evaluation of analyzis.         MSD.D. Log Day appropriate technology, including spreadow and statistical investigative question of interest.       Max DOC 1       Max DOC 2         MSD.D. Log Day appropriate technology, including spreadow and appropriate technology, including and paper ophysis.       Assessed at the local level       evaluation of interest.         MSD.D. Log Day and appropr			Identifies the geometric proof related to quadrilaterals. DOK: 1	
DATA: Students will solve problems and reason with       Image: Control of the second students will solve problems and reason with         DATA: Students will solve problems and reason with       Image: Control of the second students will solve problems and reason with         DATA: Students will solve problems and reason with       Image: Control of the second students will solve problems and reason with         DATA: Students will solve problems and reason with       Image: Control of the second students will solve problems and reason with         Students will formulate statistical investigative questions and determine how data can be collected and analyzed to provide an answer.       Image: Control of the statistical investigative question of interest.         HS. D. 1.4 Dopp an appropriate data collection plan when collecting primary data for the statistical investigative question of interest.       Image: Control of the statistical investigative question of interest.         HS. D. 1.4 Use appropriate technology, including spreadsheet-based logic, to organize data for analysis.       Image: Control of the statistical investigative question of interest.       Image: Control of the statistical investigative question of interest.       Image: Control of the control of another survey, solve reason and tables. DOI: 1       Image: Control of the control of the control of another survey, we get ments, and organize data to control of the control of another survey, we get ments, and organize data collection in the context of a collection of another survey, and experiment, and an observational study. DOI: 1       Image: Control of the context of an organize data collectin the statistical investigative question of indenties the definit	HS.G.4.f Prove and apply geometric theorems about		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.     Image: Communicate statistical investigative questions, collect data, and organize data.     Image: Communicate statistical investigative questions, collect data, and organize data.     Image: Communicate statistical investigative questions and determine how data can be collected and analyzed to provide an answer.     Image: Communicate statistical investigative questions of the statistical investigative question of interest.     Image: Communicate statistical investigative question of interest.       HS.D.1. D Apply an appropriate data collection plan when collecting orimary data for the statistical investigative question of interest.     Image: Communicate data collection plan when collecting orimary data for the statistical investigative question of interest.     Image: Communicate data collection plan when collecting orimary data for the statistical investigative question of interest.     Image: Communicate data collection plan when collecting orimary data for the statistical investigative question of interest.     Image: Communicate data collection data collection plan when collecting originate data collection spreadsheet-based logic, to organize data for analysis.     Image: Communicate data collection data collecting or analysis.     Image: Communicate data collection data collecting data collection statistics, DOC: 1     Image: Collecting data collection data collecting data collecting data collection dependence data collecti	quadrilaterals using deductive reasoning.			
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Students will formulate statistical investigative questions, collect data, and organize data.       Assessed at the local level         HS. D.1.a Formulate multi-variable statistical investigative questions and determine how data can be collected and analyzed to provide an answer.       Assessed at the local level         HS. D.1.b Apply an appropriate data collection plan when collecting primary data for the statistical investigative question of interest.       Assessed at the local level         HS. D.1.b Apply an appropriate data collection plan when collecting primary data for the statistical investigative question of interest.       Sector and analyzed to provide an answer.         HS. D.1.b Apply an appropriate technology, including spreadsheet-based logic, to organize data for analysis.       Determines the definitions of randomized surveys, experiments, and observational studies. DOI: 1       Distinguishes between surveys, randomized orgeriments, and observational studies. DOI: 1       Max DOI: 1       Max DOI: 2         HS. D.1.c Understand what constitutes good practice in designing a sample survey, an experiment, and observational study is or andomized survey, samples and random samples.       Determines the definitions of populations, samples and random samples.       Determines with edefinitions or anound confounding variables. DOI: 2       Max DOI: 2       Max DOI: 3         HS. D.1.f Understand what constitutes good practice in observational study.       Determines the definitions of populations, samples and random samples.       Determines eamples of bias or confounding variables in the context of data collection, and confounding variables. DOI: 1       Max DOI: 2	HS.D.1 Data Collection and Statistical Methods:			
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HS.D.1.d Distinguish between surveys, observational studies, and experiments.       Max DOK: 1       Max DOK: 2         None at this level.       Determines if a sample survey, an experiment, or an observational study is or observational study. DOK: 2       Explains why a certain st observational study is or observational study.         HS.D.1.e Understand what constitutes good practice in designing a sample survey, an experiment, and an observational study.       Determines the definitions of populations, samples and random samples, bias in the context of data collection, and confounding variables. DOK: 1       Determines examples of bias and confounding war bok: 1       Determines examples of bias and confounding war bok: 1       Justifies why a confound is vok: 3         Msx DOK: 2       Max DOK: 1       Max DOK: 1       Determines examples of bias and confound ing war bok: 3       Justifies why a confound ing war bok: 3         Max DOK: 1       Max DOK: 1       Max DOK: 2       Max DOK: 3       Justifies why a confound ing war bok: 3         Max DOK: 2       Max DOK: 1       Max DOK: 2       Justifies why a confound ing war bok: 3       Justifies why a confound ing war bok: 3         Max DOK: 3       Max DOK: 1       Max DOK: 3       Justifies why a confound ing war bok: 3       Justifies why a confound ing war bok: 3		observational studies. DOK: 1	observational studies in the context of a problem. DOK: 1	would be most appropria
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HS.D.1.F Understand issues of bias and confounding variables for interpretation. HS.D.1.f Understand issues of bias and confounding variables for interpretation.	US D 1 o Understand what constitutor good practice in		Identifies the best practice to use for a sample survey, an experiment, or an observational study. DOK: 2	Determines what change experiment, or an observ
uesigning a sample survey, an experiment, and an observational study.       Max DOK: 2       Max DOK: 3         observational study.       Determines the definitions of populations, samples and random samples, bias in the context of data collection, and confounding variables. DOK: 1       Determines examples of bias or confounding variables in the context of a problem. This may include determining ways to remove/minimize bias or reformulate questions. DOK: 2       Justifies statements about between two other variations of populations, samples and random samples, bias in the context of data collection, and confounding variables. DOK: 1       Determines examples of bias or confounding variables in the context of a data collection, and confounding variables. DOK: 1       Determines examples of bias or confounding variables or reformulate questions. DOK: 2       Justifies why a confound between two other variations of populations, samples and random samples, bias not confound their implications for       Max DOK: 3	designing a cample survey an experiment, and an			practices. DOK: 3
Observational study.       Max DOK: 3         Max DOK: 3       Max DOK: 3         Determines the definitions of populations, samples and random samples, bias in the context of data collection, and confounding variables. DOK: 1       Determines examples of bias or confounding variables in the context of a ta collection, and confounding variables. DOK: 1       Justifies statements about the problem. This may include determining ways to remove/minimize bias or reformulate questions. DOK: 2       Justifies why a confound between two other variation         Max DOK: 1       Max DOK: 1       Max DOK: 2       Max DOK: 3	designing a sample survey, an experiment, and an		Max DOK: 2	
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HS.D.1.f Understand issues of bias and confounding variables in a study and their implications for interpretation Max DOK: 1 Max DOK: 1 Max DOK: 2 Max DOK: 3 Max DOK: 4 Max DOK		bias in the context of data collection, and confounding variables. DOK: 1	problem. This may include determining ways to remove/minimize bias or	sustines statements abou
HS.D.1.f Understand issues of bias and confounding variables in a study and their implications for interpretation			reformulate questions. DOK: 2	Justifies why a confound
variables in a study and their implications for Max DOK: 3	HS.D.1.f Understand issues of bias and confounding	Max DUK: 1	Max DQK: 2	between two other varia
interpretation	variables in a study and their implications for			Max DOK: 3
	interpretation.			

f related to triangles, congruent triangles, and
related to quadrilaterals. DOK: 2
, randomized experiments, or observational studies
ate in the context of a problem. DOK: 2
ep in a sample survey, an experiment, or an
is not good practice. DOK: 3
s need to be made to a sample survey an
vational study to have it comply with good
ut bias within the context of data collection. DOK: 3
Ing variable explains a distorted relationship
DIC3. DOK. 3

HS.D.2 Analyze Data and Interpret Results: Students			
will represent and analyze the data and interpret the			
results.			
HS D 2 a Identify appropriate ways to summarize and			
then represent the distribution of univariate data and			
hivariate data through the construction of histograms			
dot plots stem plots box plots cumulative relative		Assessed at the local level	
frequency graphs, time plots, circle graphs, stacked bar			
graphs, and mosaic bar graphs by hand or with			
technology.			
	Determines the best choice of spread for a data set based on which	Identifies outliers of the data within the context of the problem. DOK: 2	None at this level.
	measure of center is selected (mean and standard deviations, median and		
	interquartile range) and/or the existence of outliers. DOK: 2	Determines the interquartile range for a set of data. DOK: 2	
	Refer to 6.D.2.e for describing data shape and spread of data presented in	Determines the standard deviation for a set of data. DOK: 2	
	box plots, histograms, stem-and-lead plots, line plots, and bar graphs.		
	Refer to HS.D.2.d for interpreting normal distribution.	Compares information between two sets of data involving interquartile range and/or standard deviation. DOK: 2	
HS.D.2.b Describe the shape, identify any outliers, and	Max DOK: 2	Max DOK: 2	
determine the spread of a data set.			
	None at this level.	Determines the appropriate measure of center based on the shape of a	Explains why a given mea
HS D 2 c Select and determine the appropriate	Pofor to HS D 2 h for datarmining standard deviation	distribution and/or the presence of outliers. DOK: 2	the shape of a distributio
measure of center based on the shape of a distribution	Refer to 113.D.2.D for determining standard deviation.	Max DOK: 2	Max DOK: 3
and/or the presence of outliers	Refer to HS.D.2.d for recognizing normal distributions.		
	None at this level.	Determines when a data set represents a normal distribution. DOK: 2	Interprets data represent
HS.D.2.0 Recognize when a data set can be reasonably			standard deviation to dra
said to be normally distributed and draw conclusions	Refer to HS.D.2.b for determining standard deviation.	Max DOK: 2	Max DOK: 2
distribution			
	Completes a partially filled in two-way frequency or relative frequency	Constructs a frequency or relative frequency table to summarize data on	Explains or justifies states
	table summarizing data on two categorial variables collected from the	two categorial variables collected from the same subjects. DOK: 2	tables on two categorical
	same subjects. DOK: 1		2
HS D 2 e Summarize categorical data for two	Uses information from a frequency or relative frequency table to answer	associations between the two categorial variables to describe possible	Max DOK: 2
categories in two-way frequency tables. Interpret	specific questions about the data. DOK: 1	directly from the table. DOK: 2	
relative frequencies in the context of the data and	Max DOV: 1	Max DOK: 1	
recognize possible associations and trends in the data.	Wax DOK. 1	IVIAX DOK. 2	
	None at this level.	Determines the general trend of data that can be represented in scatter	Justifies statements abou
		plots that follows linear, quadratic, or other non-linear patterns and	
	of best fit/regression line.	answers questions based on that trend. DOK: 1	Max DUK: 2
HS.D.2.f Represent data on two quantitative variables		Identifies the scatter plot that represents a set of data and describe how	
on a scatter plot and describe how the variables are	Refer to 8.D.2.d for making predictions given a line of best fit (equation or graph)	the variables are related. DOK: 2	
related.	graph).	Max DOK: 2	
	None at this level.	Determines the rate of change or the linear equation to model data	Makes predictions for un
		provided in a scatter plot. DOK: 2	modeled by a linear or no
	Refer to 8.D.2.d for making a prediction or interpreting a value using a given equation for the line of best fit or a graphed line of best fit.	Interprets slope and v-intercept that models the provided data in the	in a table or set of ordere the equation, DOK: 2
	0	context of the problem. DOK: 2	
			Max DOK: 2
		modeled by a linear or non-linear equation when the data is provided in a	
HS.D.2.g Use technology to develop regression models		scatter plot and a curve can be determined from the scatterplot. The curve	
for linear and non-linear data to predict unobserved		of best fit is not provided and the equation is not given. DOK: 2	
outcomes. Interpret slope and y-intercept in the		Max DOK: 2	
context of the problem.			

asure of center is or is not appropriate based on on and/or the presence of outliers. DOK: 3
ted by a normal distribution, including using the aw conclusions and fit data. DOK: 2
ments based on frequency or relative frequency
l variables collected from the same subjects. DOK:
ut trends of non-linear data. DOK: 2
observed outcomes using data that can be
on-linear equation when only the data is provided ed pairs. Requires using technology to determine

	Determines a likely correlation coefficient for a given set of data. (e.g.,	Determines the strength of association using correlation coefficients for	Explains the value of a corr
	-1?) DOK: 1	regression curves. DOK: 1	the line of best fit. DOK: 2
HS D 2 h Measure the strength of association using		Interprets the meaning of the correlation coefficient based on the model.	Max DOK: 2
correlation coefficients for regression curves and	Max DOK: 1	DOK: 2	
interpret their meanings for the model.		Max DOK: 2	
	Identifies the residual plot that corresponds to a line of best fit. DOK: 1	Evaluates a linear model based on the residual plot. DOK: 2	Explains how the residuals
	Max DOK: 1	Max DOK: 2	assessing the fit of a mode
HS.D.2.i Use residuals and residual plots to judge the			Max DOK: 2
quality of a regression model.			
	Determines the definition of causation and correlation. DOK: 1	Determines when causation or correlation exist within the context of a	Analyzes statements of ca
HS D 2 i Recognize and explain when arguments based	Max DOK: 1	problem and distinguish between the two. Dok. 2	
on data confuse correlation with causation		Max DOK: 2	Max DOK: 2
	Determines if the difference between calculated parameters is significant	Determines if the difference between calculated parameters is significant	Explains the analysis of sta
	without a context. DOK: 2	in the context of a situation. DOK: 2	DOK: 3
HS.D.2.k Understand what constitutes statistical	Max DOK- 2	Answers an investigative question using statistical significance DOK: 2	Max DOK: 2
significance. Interpret statistical significance in the	IVIDA DON. 2	Answers an investigative question using statistical significance. DOK. 2	Max DOK. 5
context of a situation and answer investigative		Max DOK: 2	
questions appropriately.			
	Identifies instances that do or do not closely match a null hypothesis given	Determines the risk in a situation given the p-values. DOK: 1	Explains the meaning of a
HS.D.2.I Use probability as a tool for assessing risk and	the p-value. DOK: 1	Max DOK: 1	Max DOK: 2
for informed decision making by interpreting P-values.	Max DOK: 1		
HS.D.3 Probability: Students will interpret and apply			
concepts of probability.			
	Identifies the union, intersection, or compliments of sets given the sample	Identifies subsets as being unions, intersections, or complements of other	Creates or identifies event
	space. DOK. 1	events. DOK. 1	compliments (Ex.(A B)∩C
HS.D.3.a Describe events as subsets of a sample space	Max DOK: 1	Creates or identifies the union, intersection, or compliments of sets given	
using characteristics of the outcomes or as unions.		context of an event. DOK: 2	Max DOK: 2
intersections, or complements of other events.		Max DOK: 2	
	Identifies events as being independent or dependent. DOK: 1	Explains the difference between an independent versus dependent event.	None at this level.
		DOK: 2	
HS.D.3.b Explain independent versus dependent	Max DOK: 1	Max DOK: 2	
probability of an event.			
	Identifies situations where order matters in counting. DOK: 1	Calculates the probabilities of events using combinations and	Explains why a combination
	Max DOK: 1		probabilities of events. De
HS.D.3.c Determine when order in counting matters		Counts the number of occurrences of an event using combinations and	Max DOK: 2
and use permutations and combinations to compute		permutations. DOK: 2	
probabilities of events accordingly.		Max DOK: 2	
	Identifies mutually exclusive events. DOK: 1	Determines the probability of a mutually exclusive event. DOK: 2	Explain why events are or
			probabilities. DOK: 2
	Max DOK: 1	Determines the probability of either mutually exclusive event occurring. DOK: 2	Max DOK: 2
HS.D.3.d Determine whether or not events are		Determines whether or not events are mutually exclusive based on their	
mutually exclusive (disjoint) and calculate their		probabilities. DOK: 2	
probabilities in either case.		Max DOK: 2	
	Identifies or uses graphical representations that represent a situation that	Identifies concepts of conditional probability and independence in	Explains the concepts of co
HS.D.3.e Recognize and explain the concepts of	Involves at least one conditional probability. DOK: 2	everyday language and everyday situations. DOK: 2	complex everyday languag
conditional probability in everyday language and	Max DOK: 2	Max DOK: 2	Max DOK: 2
everyday situations.			

rrelation coefficient when given a scatter plot and 2
ls or a regression model are important or used in
lel. DOK: 2
ausation within the context of a problem and the
atistical significance in the context of a situation.
riven pyalue DOK. 2
nt that requires a combination of two or more ristics include the union, intersection, or C). DOK: 2
on or permutation should be used to calculate the
OK: 2
r are not mutually exclusive using given
conditional probability and independence in
Be and every vary situations. DON. 2