

SEC III PLD	Standard	Below Proficient	Approaching Proficient	Proficient	Highly Proficient
		The Level 1 student is below proficient in applying the English language arts/literacy, mathematics, and science knowledge/skills as specified in the Utah Core State Standards. The student generally performs significantly below the standard for the grade-level/course, is likely able to partially access grade level content and engages with higher order thinking skills with extensive support.	The Level 2 student is approaching proficient in applying the English language arts/literacy, mathematics, and science knowledge/skills as specified in the Utah Core State Standards. The student generally performs slightly below the standard for the grade-level/course, is able to access grade-level content and engages in higher order thinking skills with some independence and support.	The Level 3 student is proficient in applying the English language arts/literacy, mathematics, and science knowledge/skills as specified in the Utah Core State Standards. The student generally performs at the standard for the grade level/course, is able to access grade-level content, and engages in higher order thinking skills with some independence and minimal support.	The Level 4 student is highly proficient in applying the English language arts/literacy, mathematics, and science knowledge/skills as specified in the Utah Core State Standards. The student generally performs significantly above the standard for the grade level/course, is able to access above grade-level content, and engages in higher order thinking skills independently.
		<b>NUMBER AND QUANTITY/Algebra</b>			
		<b>The Level 1 Student:</b>	<b>The Level 2 Student:</b>	<b>The Level 3 Student:</b>	<b>The Level 4 Student:</b>
Range	N.CN.8	Adds, subtracts, and multiplies two complex, linear factors.	Rewrites a quadratic as the product of two complex linear factors.	Multiplies 3 or more linear factors, at least two of which are complex, to form a polynomial. Divides a quadratic by a complex linear factor.	Rewrites a polynomial of degree 3 or higher as a product of linear factors which may or may not be complex. Divides a polynomial of degree 3 or higher by a complex linear factor.
Range	N.CN.9	Identifies the maximum number of roots possible for a given polynomial.	Given a specific polynomial, identify all possible combinations for the number of real roots and the number of complex roots.	Given the graph of a polynomial of a known degree, identifies the number of real roots and the number of complex roots. [Multiplicity?]	Given the graph of a known polynomial of degree 3 or higher, with all real roots shown explicitly on the graph, finds the remaining roots of the polynomial.
		<b>Number and Quantity/ALGEBRA</b>			
		<b>The Level 1 Student:</b>	<b>The Level 2 Student:</b>	<b>The Level 3 Student:</b>	<b>The Level 4 Student:</b>
Range	A.SSE.1ab	Identifies parts of an expression, such as terms, factors, numeric coefficients and exponents.	Interprets parts of an expression (such as terms, factors, numeric coefficients and exponents, including those involving radical functions) by viewing one or more of their parts as a single entity.	Interprets complicated expressions with variable coefficients and exponents (including those involving radical, rational, or logarithmic functions) by viewing one or more of their parts as a single entity. Determines the practical domain of an expression in a given problem situation.	Interprets complicated expressions that model natural phenomena, including those involving radical, rational, or logarithmic functions, and explains the role of the various parts of the expression in context of the problem situation.
Range	A.SSE.2	Identifies structure used to rewrite polynomial expressions.	Identifies structure used to rewrite rational and polynomial expressions.	Recognizes equivalent forms of complicated expressions, particularly those involving rational or polynomial functions, and uses the structure of the expression to identify ways to rewrite it.	Rewrites complicated expressions (including those involving rational or polynomial functions) to equivalent forms using the structure of the expression. Makes generalizations by rewriting expressions in context using their structure.
Range	A.SSE.4	Writes a geometric sequence using a formula and finds the sum by addition.	Finds the sum of a simple expression written in summation notation (e.g. $\sum_{n=1}^m a_n$ to $m=4$ of $2n$ ).	Writes a formula for the sum (when given the geometric series) and uses the formula to solve problems.	Writes a geometric series from a context, using summation notation, and finds its sum.
Range	A.APR.1	Adds, subtracts, or multiplies monomials.	Adds, subtracts, or multiplies polynomial expressions with single variables and at least two terms.	Adds, subtracts, and multiplies polynomials, where at least one polynomial is degree 3 or higher.	Adds, subtracts, and multiplies polynomials of degree 3 or higher in a problem-solving context.
Range	A.APR.2	Given a polynomial in factored form, identifies the zeroes of the polynomial.	Divides a polynomial by a factor $(x - a)$ .	Using the Remainder Theorem, decides whether $(x - a)$ is a factor of a given polynomial.	Explains why $(x - a)$ is a factor of $p(x) = 0$ when $p(a) = 0$ .
Range	A.APR.3	Identifies the zeroes of a function from a graph.	Uses zeroes to sketch the graph of a function given in factored form.	Factors a polynomial and uses zeroes to sketch a graph of the function.	Identifies zeroes from the graph and uses zeroes to construct the function.
Range	A.APR.4	Identifies a polynomial identity.	Justifies an algebraic identity by testing with specific numbers.	Proves polynomial identities and uses them to describe numerical relationships.	Algebraically justifies the validity of polynomial identities. Uses the identity to describe numerical relationships in a given context.
Range	A.APR.5	Expands $(x + a)^2$ to its equivalent trinomial form, where $a$ is an integer.	Expands $(ax + b)^2$ to its equivalent trinomial form, where $a$ and $b$ are integers.	Expands $(x + y)^n$ to its reduced polynomial form using the Binomial Theorem, where $x$ and $y$ are integers or a single variable, and $n$ is a positive integer.	Expands $(ax + by)^n$ to its reduced polynomial form using the Binomial Theorem.
Range	A.APR.6	Rewrites simple rational expressions in different forms, such as rewriting $a(x)/x$ in the form $q(x) + 0$ , where $a(x)$ and $q(x)$ are polynomials.	Rewrites simple rational expressions in different forms, such as rewriting $a(x)/x$ in the form $q(x) + r/x$ , where $a(x)$ and $q(x)$ are polynomials and $r$ is an integer.	Rewrites simple rational expressions in different forms, such as rewriting $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$ , where $a(x)$ , $b(x)$ , $q(x)$ and $r(x)$ are polynomials, with the degree of $r(x)$ less than the degree of $b(x)$ .	Rewrites simple rational expressions in different forms such as rewriting $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$ where $a(x)$ , $b(x)$ , $q(x)$ and $r(x)$ are polynomials, with the degree of $r(x)$ less than the degree of $b(x)$ , and $b(x)$ with degree 2 or above.
Range	A.APR.7	Adds or subtracts two rational expressions with a common denominator.	Multiplies two rational expressions, factoring when necessary in order to recognize common factors.	Adds, subtracts, multiplies, and divides nonzero rational expressions.	Understands and explains that rational expressions form a system analogous to the integers.
Range	A.CED.1	Identifies a linear, quadratic, or exponential equation or inequality that models a given situation.	Identifies a rational, radical, polynomial, trigonometric, or logarithmic equation or inequality that models a given situation.	Creates a rational, radical, polynomial, trigonometric, or logarithmic equation or inequality, and uses it to solve problems.	Explains the meaning of solutions (including extraneous), in reference to context.
Range	A.CED.2	Identifies a linear, quadratic, or exponential graph that represents relationships between quantities.	Identifies a rational, radical, polynomial, trigonometric, or logarithmic graph that represents relationships between quantities.	Creates rational, radical, polynomial, trigonometric, or logarithmic equations and graphs that represent relationships between quantities.	Interprets the relationship between the independent and dependent variables, in reference to context.
Range	A.CED.3	Identifies whether a proposed solution is viable or non-viable for a system of equations with given constraints.	Identifies domain, range, asymptotes, and points of discontinuity for a system of equations.	Writes a system of equations or inequalities to represent constraints, and interprets solutions.	Interprets solutions as viable or non-viable based on constraints, in reference to context.
Range	A.CED.4	Rearranges simple formulas (requiring only one step) to highlight a quantity of interest.	Rearranges simple formulas (requiring two steps) to highlight a quantity of interest.	Rearranges simple rational, exponential, logarithmic, or multi-step formulas to highlight a quantity of interest.	Rearranges more complex formulas (such those formed from compositions) to highlight a quantity of interest.
Range	A.REI.2	Identifies simple rational and radical equations.	Identifies the number of solutions and extraneous solutions, given a simple rational or radical equation.	Solves simple rational and radical equations and identifies extraneous solutions.	Solves complicated rational and radical equations and justifies extraneous solutions.
Range	A.REI.11	Finds the solution to $f(x)=g(x)$ , where $f(x)$ and $g(x)$ are linear, and the solution to quadratic functions presented in a graph.	Finds the solution to $f(x)=g(x)$ , where $f(x)$ and $g(x)$ are absolute value and exponential functions.	Finds the solution to $f(x)=g(x)$ , where $f(x)$ and $g(x)$ are polynomial, rational, radical, absolute value, exponential, or logarithmic functions presented in different forms. Justifies why the $x$ -coordinates of the points of intersection are solutions to the equation $f(x)=g(x)$ .	Interprets solutions to $f(x)=g(x)$ , where $f(x)$ and $g(x)$ are polynomial, rational, radical, absolute value, exponential, or logarithmic functions presented in different forms, in reference to context.
		<b>Functions</b>			
		<b>The Level 1 Student:</b>	<b>The Level 2 Student:</b>	<b>The Level 3 Student:</b>	<b>The Level 4 Student:</b>
Range	F.IF.4	Interprets key features of graphs and tables that model a linear function. Sketches graphs showing key features, given a verbal description of a linear relationship.	Interprets key features of graphs and tables that model a quadratic function. Sketches graphs showing key features, given a verbal description of a quadratic relationship.	Interprets key features of graphs and tables that model a function that is neither linear nor quadratic. Sketches graphs showing key features, given a verbal description of a relationship that is not linear or quadratic.	Interprets complex features of a function modeling a real-world context, given a verbal description.
Range	F.IF.5	Expresses the domain of a linear function from its graph (in a given context), using either set or interval notation.	Expresses the domain of a quadratic function from its graph (in a given context), using either set or interval notation.	Expresses the domain of a function that is neither linear nor quadratic from its graph (in a given context), using either set or interval notation.	Relates the domain of a function to its graph in a given context.
Range	F.IF.6	Calculates and interprets the average rate of change of a linear function over a specified interval from a graph of the function.	Calculates and interprets the average rate of change of a quadratic function over a specified interval. Estimates the rate of change from a graph of a quadratic function.	Calculates and interprets the average rate of change of a function (non-linear and non-quadratic) over a specified interval. Estimates the rate of change from a graph.	Compares the average rate of change of two non-linear functions over a specified interval.
Range	F.IF.7b	Graphs basic square root, cube root, piece-wise, step-wise, or absolute value functions, and describes key features.	Graphs square root, cube root, piece-wise, step-wise, or absolute value functions (with one transformation), and describes key features.	Graphs complex square root, cube root, piece-wise, step-wise, or absolute value functions, and describes key features.	Explains how key features can be used to quickly sketch square root, cube root, piece-wise, step-wise, or absolute value functions.
Range	F.IF.7c	Graphs quadratic functions and correctly identifies zeroes and describes end behavior.	Chooses the graph of a polynomial function (degree 3 or higher) that matches given key features.	Graphs a polynomial function (degree 3 or higher); correctly identifies zeroes and describes end behavior.	Identifies additional features (such as multiplicity of zeroes, locations of minimums and maximums, domain and range appropriate to a context, or intervals where the function is increasing or decreasing) for a polynomial function of degree 3 or higher.
Range	F.IF.7e	Graphs basic exponential, logarithmic, and trigonometric functions, and describes key features.	Graphs exponential, logarithmic, and trigonometric functions (with one transformation), and describes key features.	Graphs complex exponential and logarithmic functions and shows intercepts and end behaviors. Graphs complex trigonometric functions and shows period, midline, and amplitude.	Explains how key features can be used to quickly sketch exponential, logarithmic, or trigonometric functions.
Range	F.IF.8	Expresses linear and quadratic functions in equivalent forms to reveal their properties.	Expresses a polynomial function (of degree 3 or higher) and exponential functions in equivalent forms to reveal their properties.	Expresses any function (including trigonometric, logarithmic, and simple rational functions) in equivalent forms to reveal different properties.	Expresses complex functions in a different form to reveal different properties. Explains why expressing a function in a certain form helps to solve a real-world problem.
Range	F.IF.9	Compares the properties of two functions (linear or exponential), each represented in two different ways (algebraically, graphically, numerically in tables, or by verbal descriptions).	Compares the properties of two quadratic functions, each represented in two different ways (algebraically, graphically, numerically in tables, or by verbal descriptions).	Compares the properties of two functions (non-linear, non-quadratic, and non-exponential), each represented in two different ways (algebraically, graphically, numerically in tables, or by verbal descriptions).	Explains the benefits and drawbacks of different representations of a function by comparing two different representations.
Range	F.BF.1b	Adds a constant to a function or multiplies a function by a constant to model a real-world context.	Applies arithmetic operations to multiple linear or exponential functions to build a new function to model a real-world context.	Combines standard functions using arithmetic operations.	Determines whether combining two functions is appropriate to a context and performs the correct operations.

Range	F.BF.3	For a linear and exponential function, $f(x)$ , identifies the effect on the graph of replacing $f(x)$ with $f(x) + k$ , $kf(x)$ , $f(kx)$ , and $f(x + k)$ for specific values of $k$ (both positive and negative). Estimates the value of $k$ given the graphs. Compares two functions of the same kind that differ by a transformation, and identifies the transformation.	For quadratic and logarithmic functions, $f(x)$ , identifies the effect on the graph of replacing $f(x)$ with $f(x) + k$ , $kf(x)$ , $f(kx)$ , and $f(x + k)$ for specific values of $k$ (both positive and negative). Estimates the value of $k$ given the graphs. Compares two functions of the same kind that differ by a transformation, and identifies the transformation.	For any function, $f(x)$ , identifies the effect of the graph of replacing $f(x)$ with $f(x) + k$ , $kf(x)$ , $f(kx)$ , and $f(x + k)$ for specific values of $k$ (both positive and negative). Estimates the value of $k$ given the graphs. Compares two functions of the same kind that differ by a transformation, and identifies the transformation.	Recognizes even and odd functions from their graphs and algebraic expressions.
Range	F.BF.4a	Finds inverse functions for linear functions. Identifies whether a function has an inverse from its graph.	Identifies whether a function has an inverse from any representation.	Finds inverse function for a simple non-linear function, if it exists.	Restricts the domain in order to find an inverse.
Range	F.LE.4	Evaluates a logarithm using technology.	Expresses a logarithmic expression (with no variables) in equivalent exponential form.	Expresses the solution to $ab^x(ct)=d$ as a logarithm (where $b$ is 2, 10, or $e$ ). Evaluates a logarithm using technology.	Apply logarithms to solve for variables in exponents for contextual problems (such as continuous interest or uninhibited growth/decay).
Range	F.TF.1	Knows that a full rotation of a circle is $2\pi$ radians.	Locates a radian measure between 0 and $2\pi$ on a unit circle.	Locates any radian measure on a unit circle.	Explains that the radian measure of an angle is equivalent to the length of the arc on the unit circle subtended by the angle.
Range	F.TF.2	Identifies the sine and cosine of angles in the first quadrant of a unit circle. Recognizes that the coordinates of any point on the unit circle may be defined as $(\cos \theta, \sin \theta)$ .	Identifies the sine and cosine of angles on the unit circle.	Explains that one can travel around the unit circle any real number of units and arrive at a set of coordinates that defines trigonometric functions for all real numbers.	Explains that one can travel around any circle any real number of units and arrive at a set of coordinates that defines trigonometric functions for all real numbers.
Range	F.TF.3	Finds side lengths of a special right triangle, given one side.	Finds trigonometric values for $\pi/3$ , $\pi/4$ , and $\pi/6$ (given a special right triangle).	Uses special right triangles to determine the values of the sine, cosine, and tangent on the unit circle.	Uses the unit circle to express the values of sine, cosine, and tangent for $\pi - x$ , $\pi + x$ , and $2\pi - x$ , in terms of their values for $x$ (where $x$ is any real number).
Range	F.TF.5	Identifies the amplitude, frequency, and midline of a given trigonometric function.	Writes a trigonometric function (given a specific amplitude, frequency, and midline).	Writes an appropriate trigonometric function to model a real-world context (where the information about amplitude, frequency, and midline are given clearly).	Analyzes a real-world context to determine which information can be used to write a trigonometric function. Uses this analysis to model the context with a trigonometric function.
<b>Geometry</b>					
		<b>The Level 1 Student:</b>	<b>The Level 2 Student:</b>	<b>The Level 3 Student:</b>	<b>The Level 4 Student:</b>
Range	G.SRT.9	Finds the area of a triangle, given the formula $A = \frac{1}{2} ab \sin(C)$ (given the dimensions).	Determines the side and angle relationships using a given figure. Finds the area of the triangle using the formula $A = \frac{1}{2} ab \sin(C)$ .	Derives the formula $A = \frac{1}{2} ab \sin(C)$ for the area of a triangle. Expresses the area of any triangle in terms of the sides and angles, and includes an appropriately labeled figure.	Derives and apply the formula, $A = \frac{1}{2} ab \sin(C)$ , within a given context.
Range	G.SRT.10	Uses the Laws of Sines or Cosines to solve for a missing side in a triangle.	Uses the Laws of Sines or Cosines to solve for a missing angle in a triangle.	Proves the Laws of Sines and Cosines and uses them to solve problems.	Proves the Law of Sines or Law of Cosines. Uses the Law of Sines with the ambiguous case.
Range	G.SRT.11	Uses the Law of Sines or Cosines to solve for a missing value in a triangle, when prompted to use the correct Law, given a labeled diagram.	Using the appropriate Law, solves for a missing value in a triangle in a context, given a labeled diagram for the context.	Using the appropriate Law, solves for a missing value in a triangle in a context, without a labeled diagram being provided.	Using the appropriate Law, solves for a missing value in a triangle in a context which could be an example of the ambiguous case.
Range	G.GMD.4	Identifies the shapes of two-dimensional cross-sections formed by a vertical or horizontal plane.	Identifies a three-dimensional object generated by rotations of a simple two-dimensional object about a line of symmetry of the object.	Identifies the shapes of two-dimensional cross-sections of three-dimensional objects. Identifies a three-dimensional object generated by rotations of two-dimensional objects.	Sketches the shape of a particular two-dimensional cross-section of a three-dimensional shape. Sketches the three-dimensional object that results from the rotation of a given two-dimensional object.
Range	G.MG.1	Identifies geometric shapes that model a real-world object.	Uses a geometric shape modeled in a simple real-world object to determine the appropriate measures.	Uses geometric shapes, measures, and properties to model and describe objects.	Uses composite geometric shapes, measures, and properties to model and describe objects.
Range	G.MG.2	Calculates density based on area, when a formula is given.	Calculates density based on volume (when a formula is given), and identifies appropriate unit rates.	Uses properties of density based on area and volume to model a situation in context.	Compares and contrasts density rates in a modeling context.
Range	G.MG.3	Identifies relevant geometric models for use in solving a design problem.	Compares quantitatively different proposed solutions to a design problem, using geometric properties of the solution.	Designs a structure to meet constraints and optimization requirements.	Designs a composite structure to meet constraints and optimization requirements.
<b>Statistics and Probability</b>					
		<b>The Level 1 Student:</b>	<b>The Level 2 Student:</b>	<b>The Level 3 Student:</b>	<b>The Level 4 Student:</b>
Range	S.ID.4	Labels a blank normal distribution curve with the appropriate mean and standard deviations.	Uses the Empirical Rule to label a blank normal distribution curve with the appropriate percentages (68%-95%-99.7%).	Uses the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages using the Empirical Rule.	Additionally, recognizes that there are data sets for which such a procedure is not appropriate. Uses technology or tables to estimate areas under the normal curve.
Range	S.IC.1	Describes why a particular sample is not representative.	Describes why a particular sample is not random. Determines what inferences can be made about a population from a given representative random sample.	Explains why a representative random sample is appropriate to make inferences about a population. Explains how a sample may be random, but not representative of the underlying population, or how a sample may be representative but not random.	Explains how to select a representative random sample from a particular population.
Range	S.IC.2	Given two results, decides which is more consistent with a specific data-generating process.	Explains why a specific model is not consistent with given data-generated results.	Decides if a specified model is consistent with results from a given data-generating process, such as a simulation.	Designs a data-generating process (e.g. simulation) to evaluate whether a specified model is consistent with given results.
Range	S.IC.3	Identifies whether random sampling was used in a particular study.	Matches a given study to its category: survey, observational study, or experiment.	Explains the differences among sample surveys, experiments, and observational studies. Explains how randomization relates to each type of study.	Explains the purposes and limitations of sample surveys, experiments, and observational studies. Designs an appropriate study for a given situation.
Range	S.IC.4	Chooses an interval that represents possible population proportions or means, for a particular sample proportion or mean.	Interprets whether a particular proportion is possible, given a sample proportion or mean in context and a margin of error.	Uses $\pm 2$ standard deviations from a sample proportion or mean to create an interval that can be used to estimate possible population proportion or mean.	Develops a margin of error for a given survey through use of a simulation model.
Range	S.IC.5	Determines if the differences between two treatments are typically positive, negative, or centered about zero, given results of a randomized experiment comparing the treatments.	Calculates statistics related to a randomized experiment using two treatments.	Compares the results of a randomized experiment using two treatments to simulations in order to determine if differences in the treatments are significant.	Designs and runs a simulation to build a distribution for possible differences, for a given experiment.
Range	S.IC.6	Determines the question being investigated and the groups that were considered, given a report based on data.	Determines the way randomization was used in the design and the results, given a report based on data.	Evaluates the reasonableness of a report based on data.	Interprets the consequences of the results, given a report based on data, and discusses the statistical validity of the findings.