



ADMINISTRATIVE RULES OF MONTANA

10.53.519 CORE ALGEBRAIC AND FUNCTIONAL REASONING STANDARDS

- (1) The functions content standards for high school are to:
 - (a) interpret parts of an expression, such as terms, factors, and coefficients;
 - (b) understand the definition of a function and distinguish between functions and relations;
 - (c) represent functions using tables, graphs with appropriate scales and labels, equations, and verbal situations, while using technology strategically, by:
 - (i) understanding that different representations highlight different aspects of functions, and choosing the representation that is appropriate for the context; and
 - (ii) comparing properties of two functions, including when each is represented in a different way;
 - (d) use function notation, evaluate functions, and interpret statements that use function notation in context. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities;
 - (e) identify the domain and range of a function, including considering the constraints imposed by context. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities;
 - (f) understand that a graph of an equation in two variables is the set of all of its solutions plotted in a coordinate plane;
 - (g) understand that expressions can be rewritten in equivalent forms to make different characteristics or features visible; and
 - (h) rearrange literal equations to highlight quantities of interest.
- (2) The linear functions content standards for high school are to:
 - (a) understand that linear functions have a constant rate of change;
 - (b) understand slope as a rate of change and y-intercept as initial value;
 - (c) represent linear functions using tables, graphs, equations, and verbal situations, while using technology strategically. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities by:
 - (i) identifying the rate of change and initial value in each representation;
 - (ii) converting between representations; and

- (iii) writing equations for a line perpendicular or parallel to a given line that passes through a given point;
 - (d) understand that linear equations can be represented in multiple forms and the specific features of each form by:
 - (i) choosing the form strategically when writing an equation based on given information and intended use;
 - (ii) converting between slope-intercept, point-slope, and standard form symbolically;
 - (iii) understanding the relationship between slope-intercept form, the rate of change, and the initial value;
 - (iv) understanding the relationship between point-slope form, the rate of change, and a given point; and
 - (v) understanding the relationship between standard form and the x- and y-intercepts;
 - (e) understand that a solution to a system of equations is a coordinate pair that makes both equations true; and
 - (f) solve systems of linear equations by graphing, substitution, and elimination, including systems with zero, one, or infinite solutions, while using technology and representations strategically.
- (3) The quadratic functions and expressions content standards for high school are to:
- (a) understand that quadratic functions do not have a constant rate of change but have a constant second difference over equal intervals and identify the constant second difference in tables;
 - (b) represent quadratic functions using tables, graphs, equations, and verbal situations, while using technology strategically. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities;
 - (c) understand that quadratic expressions can be represented in multiple forms and the specific features of each form by:
 - (i) choosing the form strategically when writing an expression based on given information and intended use;
 - (ii) converting between factored, standard, and vertex form symbolically and using representations;
 - (iii) understanding the relationship between factored form and the zeros of the function; and
 - (iv) understanding the relationship between vertex form and the vertex of the function;
 - (d) solve quadratic equations by factoring, graphing, completing the square, using inverse operations, and the quadratic formula; use technology and representations strategically.
- (4) The exponential functions and expressions content standards for high school are to:
- (a) understand that exponential functions have a constant common ratio over equal intervals, and identify the common ratio in tables and equations;

- (b) understand a as the initial value and b as the growth/decay factor for an exponential function written in standard form, $y=a \cdot b^x$;
 - (c) understand the relationship between growth/decay factor and growth/decay rate;
 - (d) represent exponential functions using tables, graphs, equations, and verbal situations; using technology strategically. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities; and
 - (e) solve exponential equations graphically, while using technology strategically.
- (5) The modeling with functions content standards for high school are to:
- (a) model situations in context, with linear, quadratic, and exponential functions. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities by:
 - (i) determining if a set of data is best modeled by a linear function, quadratic function, exponential function, or none, and explaining why; and
 - (ii) understanding that there are contexts where solutions may not lie on the curve;
 - (b) interpret the coefficients in a linear, quadratic, and exponential model in context. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities;
 - (c) choose and interpret measurement units in formulas, graphs, and data displays to understand problems and to guide problem-solving in modeling situations. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities; and
 - (d) choose a level of accuracy appropriate to limitations on measurement when reporting quantities in modeling situations. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities.

Authorizing statute(s): Mont. Const. Art. X, sec. 9, 20-2-114, 20-7-101, MCA

Implementing statute(s): Mont. Const. Art. X, sec. 9, 20-2-121, 20-3-106, 20-7-101, MCA

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