

Points of Emphasis in M204

A typical instructional unit on exponential and logarithmic functions might focus on performing computations to complete tables and plot points in ways that are disconnected from real-world contexts. By contrast, in M204, students should:

- examine the structure of an exponential or logarithmic function before manipulating it in order to gain insights about the relationships involved (LP 3).
- use variables to represent quantities, defining exponential or logarithmic functions to represent mathematical or real-world situations (LP 3).
- recognize that different forms of exponential and logarithmic functions are helpful for different purposes or for particular contexts (LP 3).
- use logarithms as tools for solving exponential equations and employ reasoning to justify a solution or its reasonableness (LP 3).
- regularly encounter real-world tasks involving exponential or logarithmic relationships (LP 1) that require them to make sense of multiple representations and how they relate to each other—verbal, algebraic, numerical, graphical (LP 3).
- be able to choose tasks that are organized around different scientific, social, or other topics, allowing students to have agency in their learning (LP 4).
- frequently collaborate, share their solution methods, and make their thinking visible (LP 2).

Whereas typically, students in a course on exponential and logarithmic functions may focus on memorizing and repeatedly applying “log rules” without understanding, in M204, students should:

- regularly engage with tasks that focus on understanding and reasoning about different representations—verbal, algebraic, numerical, graphical. As examples, students should engage with the following:
 - Reason about and explain the real-world meaning of parameters in an exponential or logarithmic function.
 - Make connections between the different representations of a situation.
 - Explain the relationship between parameters in an exponential or logarithmic function and the features of their graphs (LP 3).
- learn that logarithms are a way to express the exponent that satisfies an exponential equation (LP 3).
- use open-ended tasks to interpret data, analyze graphs, and reason about the context (LP 3).
- have opportunities to share their reasoning with partners or in groups, allowing for practice sharing, critiquing, and revising their arguments and including social interaction as part of the learning process (LP 2).

Students should also be given opportunities to understand and reflect on the ways that logarithmic and exponential functions can authentically reflect real-world situations (LP 6).

Often, coursework with exponents and logarithms is focused on manipulating symbols by hand. Instead, students should be given frequent opportunities to:

- use software to graph exponential and logarithmic functions (LP 7);
- use calculators and software to compute values for exponential and logarithmic expressions and interpret their contextual meaning (LP 7).