UNIT 3

Exponential and Logarithmic Functions

General Outcome

Develop algebraic and graphical reasoning through the study of relations.

Specific Outcomes

RF2 Demonstrate an understanding of the effects of horizontal and vertical translations on the graphs of functions and their related equations.

RF3 Demonstrate an understanding of the effects of horizontal and vertical stretches on the graphs of functions and their related equations.

RF4 Apply translations and stretches to the graphs and equations of functions.

RF7 Demonstrate an understanding of logarithms.

RF8 Demonstrate an understanding of the product, quotient and power laws of logarithms.

RF9 Graph and analyze exponential and logarithmic functions.

RF10 Solve problems that involve exponential and logarithmic equations.

***Pre-Calculus 12*, pages 330–331**

Suggested Timing
30–45 min

Blackline Masters
Master 1 Holistic Project Rubric
Master 2 Ana-Holistic Project Rubric
BLM U3–1 Unit 3 Project Checklist

What's Ahead

In Unit 3, students explore exponential and logarithmic functions. They learn what these functions are, how they can be represented, the types of situations in which they are found, and how to solve problems that involve these functions. Students explore these concepts first graphically, and then algebraically. In both Chapter 7, Exponential Functions, and Chapter 8, Logarithmic Functions, students explore transformations of these types of functions. As a result, they are expected to draw on their previous knowledge of these topics. You may want to revisit transformations, and in particular the parameters a, b, h, and k, and their effect on the graphs of functions.

Planning Notes

Whenever possible, have students work in small groups or pairs. This enables them to discuss the concepts and the context of the question, and learn problem-solving strategies from one another. They can also leverage each other's knowledge of prior learning and prerequisite skills. Group work is particularly helpful for the Investigates, but students will also benefit from this type of teamwork when working through the Examples and the Check Your Understanding questions. Groups can share their understanding and strategies with the class as well. However, be sure to give students opportunities to work on their own so that you can assess whether they have grasped the concepts. When working through the chapter, you may wish to have students complete Practice questions that are related to each Example immediately after working through the Example. Alternatively, you might want to expose the class to all the Examples, and then complete the Check Your Understanding questions as a cumulative set.

One other thing to be aware of is that the unit involves extensive use of graphing technology (graphing calculators or computer graphing programs). Some students may struggle with their technology, so you should be available to help them, or work through certain examples as a class, using the technology. Again, group work will provide students with the opportunity to leverage each other's knowledge. In general, be available to answer students' question and to guide their learning using leading questions. Many examples of these have been included in this resource.

Unit 3 Project

With the class, read and discuss the introductory notes for the Unit 3 Project. You may wish to point out the Project Corners throughout Chapters 7 and 8. These features are not mandatory, but are recommended because they provide helpful information about the Unit 3 Project. You may wish to provide students with **BLM U3–1 Unit 3 Project Checklist**. Students can use the checklist as they prepare their project. Have students collect all their work for the Unit 3 Project in a portfolio.

Students do best if they know exactly how they will be evaluated. One way to increase student motivation is to work with the class to create a specific rubric for the project. You may wish to use **Master 1 Holistic Project Rubric** as a template and review the general holistic points in the 1–5 scoring levels. Alternatively, you may wish to use **Master 2 Ana-Holistic Project Rubric** and decide whether you will score the work out of 5 or out of 20. See the Web Link below for a specific rubric in each style.

For additional information on the Unit 3 Project, see pages 331, 357, 403, and 421 in the student resource and page 173, 199, and 221 in this Teacher's Resource.

Web Link

For a holistic rubric and an ana-holistic rubric related to the Unit 3 Project, go to www.mcgrawhill.ca/school/learningcentres and follow the links.