7 Exponential 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.

RF9 Graph and analyze exponential and logarithmic functions.

RF10 Solve problems that involve exponential and logarithmic equations.

By the end of this chapter, students will be able to:

Section	Understanding Concepts, Skills, and Processes
7.1	✓ graph and analyse exponential functions
	✓ solve problems that involve exponential growth or decay
7.2	✓ apply translations, stretches and reflections to the graphs of exponential functions
	✓ represent translations, stretches, and reflections in the equations of exponential functions
	✓ solve problems that involve exponential growth or decay
7.3	✓ determine the solution of an exponential equation in which the bases are powers of one another
	✓ solve problems that involve exponential growth or decay
	✓ solve problems that involve the application of exponential equations to loans, mortgages, and investments

Assessment	Supporting Learning
Assessment *for* Learning	
Method 1: Use the introduction on page 332 in *Pre-Calculus 12* to activate students' prior knowledge about the skills and processes that will be covered in this chapter. **Method 2:** Have students develop a journal entry to explain what they personally know about exponential functions.	• Have students update their list of what they need to work on and keep track of the skills and processes that need attention. • Students who require activation of prerequisite skills may wish to complete **BLM 7–1 Chapter 7 Prerequisite Skills**. This material is on the Teacher CD of this Teacher's Resource and mounted on the www.mcgrawhill.ca/school/learningcentres book site.
Assessment *as* Learning	
As students work on each section in Chapter 7, have them keep track of any problems they are having.	• As students complete each section, have them review the list of items they need to work on and check off any that have been handled. • Encourage students to write definitions for the Key Terms in their own words, including reminder tips that may be helpful for review throughout the chapter. • Encourage students to write examples of their own in their notebook or math portfolio. Students should have an example for each method that is covered in the chapter.
Assessment *for* Learning	
BLM 7–1 Chapter 7 Prerequisite Skills This master provides a review of prerequisite skills needed for the chapter.	• Use the Prerequisite Skills blackline master to provide additional opportunities for students to demonstrate their readiness for the chapter material.

Chapter 7 Planning Chart

Section/ Suggested Timing	Prerequisite Skills	Materials/Technology	Teacher's Resource Blackline Masters	Exercise Guide	Assessment			Web Link
					Assessment *as* Learning	Assessment *for* Learning	Assessment *of* Learning	www.mcgrawhill.ca/school/learningcentres
Chapter Opener • 30–45 min (TR page 173)			BLM 7–1 Chapter 7 Prerequisite Skills BLM U3–1 Unit 3 Project Checklist					• Chemistry careers and educational programs
7.1 Characteristics of Exponential Functions • 90–120 min (TR page 174)	Students should be familiar with • working with exponents, bases, and powers • functions • graphing non-linear functions • graphing technology	• graphing technology • card stock	BLM 7–2 Section 7.1 Extra Practice	**Essential:** #1–6, 8, 9 **Typical:** #1–5, 7–11, C1, C2 **Extension/Enrichment:** #10–15, C1, C2	TR pages 176, 180	TR pages 178, 180		• an overview of exponential functions and their application • exponential functions and their graphs
7.2 Transformations of Exponential Functions • 90–120 min (TR page 181)	Students should be familiar with • transformations and the effects of varying parameters in functions • graphing transformations • mathematical modelling	• graphing technology • grid paper	Master 3 Centimetre Grid Paper BLM 7–3 Section 7.2 Extra Practice	**Essential:** #1–5, 7, 8, two of 9–12 **Typical:** #2–4, 6–8, three of 9–12, C1, C2 **Extension/Enrichment:** #12–14, C1, C2	TR pages 183, 186	TR pages 185, 186		• applets to explore transformations of exponential functions
7.3 Solving Exponential Equations • 90–120 min (TR page 187)	Students should be familiar with • solving equations • expressing bases and powers in a variety of ways • loans and interest	• graphing technology	BLM 7–4 Section 7.3 Extra Practice	**Essential:** #1, 3, 4, 6, 7a), b), e), 8, 10 **Typical:** #2, 4–7, 9, 10, one of 11–14, C1, C2 **Extension/Enrichment:** #12, 15–18, C1, C2	TR pages 189, 192	TR pages 190, 192		• overview of solving exponential equations • using a calculator to solve exponential equations • solving exponential equations with the same and different bases • strategies for solving exponential equations
Chapter 7 Review and Practice Test • 90–120 min each (TR page 193)		• graphing technology • grid paper	Master 3 Centimetre Grid Paper BLM 7–2 Section 7.1 Extra Practice BLM 7–3 Section 7.2 Extra Practice BLM 7–4 Section 7.3 Extra Practice BLM 7–5 Chapter 7 Study Guide BLM 7–6 Chapter 7 Test BLM 7–7 Chapter 7 BLM Answers	Have students do at least one question related to any concept, skill, or process that has been giving them trouble. **Chapter 7 Review minimum:** #5–12 Provide students with the number of questions they can comfortably do in one class. Choose at least one question for each concept, skill, or process. **Chapter 7 Practice Test minimum:** #1–10		TR page 194	TR page 194 BLM 7–6 Chapter 7 Test	