# 2

# Radical 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.

**RF13** Graph and analyze radical functions (limited to functions involving one radical).

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

| Section | Understanding Concepts, Skills, and Processes |
|---|---|
| 2.1 | ✓ investigate the function $y = \sqrt{x}$ using a table of values and a graph |
| | ✓ graph radical functions using transformations |
| | ✓ identify the domain and range of radical functions |
| 2.2 | ✓ sketch the graph of $y = \sqrt{f(x)}$ given the graph of $y = f(x)$ |
| | ✓ explain strategies for graphing $y = \sqrt{f(x)}$ given the graph of $y = f(x)$ |
| | ✓ compare the domains and ranges of the functions of $y = f(x)$ and $y = \sqrt{f(x)}$, and explain any differences |
| 2.3 | ✓ relate the roots of radical equations and the $x$-intercepts of the graphs of radical functions |
| | ✓ determine approximate solutions of radical equations graphically |



| Assessment | Supporting Learning |
|---|---|
| **Assessment *for* Learning** | |
| **Method 1:** Use the introduction on page 60 in *Pre-Calculus 12* to activate students' prior knowledge about the skills and processes that will be covered in this chapter.<br>**Method 2:** Have students develop a journal entry to explain what they personally know about radicals and radical functions. | • Have students update their list of what they need to work on and keep track of the skills and processes that need attention.<br>• Students who require activation of prerequisite skills may wish to complete **BLM 2–1 Chapter 2 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 2, 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.<br>• 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.<br>• 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 2–1 Chapter 2 Prerequisite Skills**<br>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 2 Planning Chart

| Section/ Suggested Timing | Prerequisite Skills | Materials/Technology | Teacher's Resource Blackline Masters | Exercise Guide | Assessment | | | Web Link www.mcgrawhill.ca/school/learningcentres |
|---|---|---|---|---|---|---|---|---|
| | | | | | Assessment *as* Learning | Assessment *for* Learning | Assessment *of* Learning | |
| **Chapter Opener**<br>• 45–60 min<br>(TR page 37) | | • graphing technology | BLM 2–1 Chapter 2 Prerequisite Skills<br>BLM U1–1 Unit 1 Project Checklist | | | | | • careers and educational programs involving remote sensing |
| **2.1 Radical Functions and Transformations**<br>• 90–120 min<br>(TR page 38) | Students should be familiar with<br>• expressing a power as an equivalent radical<br>• expressing a radical as a power<br>• expressing an entire radical as a mixed radical in simplest form<br>• set notation<br>• interval notation<br>• entering expressions, setting windows, and graphing with a graphing calculator<br>• sketching graphs of functions with or without technology<br>• determining the domain and range of a function<br>• determining restrictions on a variable in an expression or equation<br>• transformations of the graphs of functions and their related equations<br>• effects of the parameters *a*, *b*, *h*, and *k* | • grid paper<br>• graphing technology | Master 3 Centimetre Grid Paper<br>BLM 2–2 Section 2.1 Extra Practice<br>TM 2–1 How to Do Page 71 Example 4d) Using TI-Nspire™ With Touchpad<br>TM 2–2 How to Do Page 71 Example 4d) Using TI-83/84 | **Essential:** #1–9, 10a), b), 18<br>**Typical:** #4, 5, 7, 9, 10c), d), one of 11–14, 15–17, C1–C4<br>**Extension/Enrichment:** #16, 17, 19, C1–C4 | TR pages 39, 43 | TR pages 42, 43 | | • the Polar Environment Atmospheric Research Laboratory |
| **2.2 Square Root of a Function**<br>• 90–120 min<br>(TR page 44) | Students should be familiar with<br>• Pythagorean theorem<br>• solving radical equations | • grid paper and ruler<br>• graphing technology (optional) | Master 3 Centimetre Grid Paper<br>BLM 2–3 Section 2.2 Check Your Understanding Graphs<br>BLM 2–4 Section 2.2 Extra Practice | **Essential:** #1–4, 5a), b), 6, 8, 9<br>**Typical:** #2, 3, 5c), d), 8–11, one of 12 or 13, 15, 16, C1–C4<br>**Extension/Enrichment:** #11, 14–19, C1–C4 | TR pages 47, 49 | TR pages 48, 49 | | • famous bridges in Canada, including truss bridges and other styles<br>• early calculations of the circumference and radius of Earth |
| **2.3 Solving Radical Equations Graphically**<br>• 90–120 min<br>(TR page 50) | Students should be familiar with<br>• solving systems of equations graphically<br>• solving systems of equations algebraically<br>• solving quadratic equations | • graphing technology | BLM 2–5 Section 2.3 Extra Practice | **Essential:** #1–6, 8–10<br>**Typical:** #2–5, 7–9, 11 or 12, 13, 14, C1–C3<br>**Extension/Enrichment:** #14–17, C1–C3 | TR pages 51, 54 | TR pages 53, 54 | | • famous bridges in Canada, including truss bridges and other styles |
| **Chapter 2 Review and Practice Test**<br>• 60–90 min<br>(TR page 55) | | • grid paper<br>• graphing technology (optional) | Master 3 Centimetre Grid Paper<br>BLM 2–2 Section 2.1 Extra Practice<br>BLM 2–4 Section 2.2 Extra Practice<br>BLM 2–5 Section 2.3 Extra Practice<br>BLM 2–6 Chapter 2 Study Guide<br>BLM 2–7 Chapter 2 Test<br>BLM 2– 8 Chapter 2 BLM Answers | Have students do at least one question related to any concept, skill, or process that has been giving them trouble.<br>**Chapter 2 Review minimum:** #1–7, 8a), 10a), 12, 13, 14b), 15, 16a), c), d), 17<br>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.<br>**Chapter 2 Practice Test minimum:** #1–5, 6a), b), 7b), c), 8–10, 12 | | TR page 55 | TR page 55<br>BLM 2–7 Chapter 2 Test | |