Radical Expressions and Equations

5

General Outcome

Develop algebraic reasoning and number sense.

Specific Outcomes

AN2 Solve problems that involve operations on radicals and radical expressions with numerical and variable radicands.

AN3 Solve problems that involve radical equations (limited to square roots).

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

Section	Understanding Concepts, Skills, and Processes
5.1	✓ convert between mixed radicals and entire radicals
	✓ compare and order radical expressions
	✓ identify restrictions on the values for a variable in a radical expression
	✓ simplify radical expressions using addition and subtraction
5.2	✓ perform multiple operations on radical expressions
	✓ rationalize the denominator
	✓ solve problems that involve radical expressions
5.3	✓ solve equations involving square roots
	✓ determine the roots of a radical equation algebraically
	✓ identify restrictions on the values for the variable in a radical equation
	✓ model and solve problems with radical equations

Assessment	Supporting Learning
Assessment *as* Learning	
Use the Before column of **BLM 5–1 Chapter 5 Self-Assessment** to provide students with the big picture for this chapter and help them identify what they already know, understand, and can do. You may wish to have students keep this master in their math portfolio and refer to it during the chapter.	• During work on the chapter, have students keep track of what they need to work on. They can check off each item as they develop the skill or process at an appropriate level.
Assessment *for* Learning	
Method 1: Use the introduction on page 270 in *Pre-Calculus 11* 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 radical expressions and equations. Encourage them to use examples and explain how to • convert between entire radicals and mixed radicals • compare and order radical expressions	• Have students use their list of what they need to work on to keep track of the skills and processes that need attention. They can check off each item as they develop the skill or process at an appropriate level. • Students who require activation of prerequisite skills may wish to complete **BLM 5–2 Chapter 5 Prerequisite Skills**. This material is on the Teacher CD of this Teacher's Resource and mounted on the www.mhrprecalc11.ca book site.
Assessment *as* Learning	
As students work on each section in Chapter 5, 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 5–3 Chapter 5 Warm-Up This reproducible master includes a warm-up to be used at the beginning of each section. Each warm-up provides a review of prerequisite skills needed for the section.	• As students complete questions, note which skills they are retaining and which ones may need additional reinforcement. • Use the warm-up to provide additional opportunities for students to demonstrate their readiness for the chapter material. • Have students share their strategies for completing mathematics calculations.

Chapter 5 Planning Chart

Section/Suggested Timing	Prerequisite Skills	Materials/Technology	Teacher's Resource Blackline Masters	Exercise Guide	Assessment *as* Learning	Assessment *for* Learning	Assessment *of* Learning
Chapter Opener • 20–30 min (TR page 177)	Students should be familiar with • square roots, cube roots, perfect squares, and perfect cubes		BLM 5–1 Chapter 5 Self-Assessment BLM 5–2 Chapter 5 Prerequisite Skills BLM U3–1 Unit 3 Project Checklist				
5.1 Working With Radicals • 80–100 min (TR page 179)	Students should be familiar with • simplifying expressions with integral and rational exponents • converting between powers and radicals • Pythagorean Theorem • converting between mixed radicals and entire radicals • comparing and ordering radicals • primary trigonometric ratios • exact value	• centimetre grid paper • ruler • scissors	Master 2 Centimetre Grid Paper BLM 5–3 Chapter 5 Warm-Up BLM 5–4 Section 5.1 Extra Practice	**Essential:** #1–3, 5–7, 8a), d), 9a), b), 10a), d), two of 11–14, 24, 25 **Typical:** #1–7, 9b), d), 10c), d), two of 14–19, 20, 23–25 **Extension/Enrichment:** #4, 8d), 9c), d), 10c), d), 16–25	TR pages 180, 185	TR pages 183, 185	
5.2 Multiplying and Dividing Radical Expressions • 90–110 min (TR page 186)	Students should be familiar with • Pythagorean Theorem • primary trigonometric ratios • exact value • adding and subtracting radicals	• regular hexagon template or compass and ruler • ruler • grid paper	Master 2 Centimetre Grid Paper BLM 5–3 Chapter 5 Warm-Up BLM 5–5 Section 5.2 Extra Practice	**Essential:** #1–3, 4a), b), 5a), c), 6, 7, 8a)–c), 9–11, 13, 14, 28, 29, 33 **Typical:** #1–3, 4c), d), 5b), d), 6, 7, 9–13, 15, 17, 28–30, 33 **Extension/Enrichment:** #3, 5, 11–13, 17, 21–28, 30–33	TR pages 188, 193	TR pages 190, 193	
5.3 Radical Equations • 100–120 min (TR page 194)	Students should be familiar with • solving equations • distributive property • difference of squares • simplifying radical expressions	• three metre sticks (or one metre stick and markings for 100 cm on wall and floor) per group • grid paper • graphing calculator or computer with graphing software	Master 2 Centimetre Grid Paper BLM 5–3 Chapter 5 Warm-Up BLM 5–6 Section 5.3 Extra Practice	**Essential:** #1–6, 8a), b), 9a), d), 10, 12–14, 24 **Typical:** #1, 2, 4, 7, 8c), d), 10–12, two of 14–17 or 19 and 20, 24–26 **Extension/Enrichment:** #6, 10, 11, 18–22, 24–27	TR pages 195, 199	TR pages 197, 199	
Chapter 5 Review • 60–90 min (TR page 200)			BLM 5–4 Section 5.1 Extra Practice BLM 5–5 Section 5.2 Extra Practice BLM 5–6 Section 5.3 Extra Practice	Have students do at least one question related to any concept, skill, or process that has been giving them trouble.		TR page 200	
Chapter 5 Practice Test • 45–60 min (TR page 201)			BLM 5–7 Chapter 5 Test BLM 5–8 Chapter 5 BLM Answers	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. **Minimum:** #1–11, 13–15	TR page 202		TR page 202 BLM 5–7 Chapter 5 Test