Polynomials

5

General Outcome

Develop algebraic reasoning and number sense.

Specific Outcomes

AN1 Demonstrate an understanding of factors of whole numbers by determining the:
- prime factors
- greatest common factor
- least common multiple
- square root
- cube root.

AN4 Demonstrate an understanding of the multiplication of polynomial expressions (limited to monomials, binomials and trinomials), concretely, pictorially and symbolically.

AN5 Demonstrate an understanding of common factors and trinomial factoring, concretely, pictorially and symbolically.

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

Section	Understanding Concepts, Skills, and Processes
5.1	✓ multiply polynomials
	✓ explain how multiplication of binomials is related to area and to the multiplication of two-digit numbers
5.2	✓ determine prime factors, greatest common factors, and least common multiples of whole numbers
	✓ write polynomials in factored form
	✓ apply their understanding of factors and multiples to solve problems
5.3	✓ develop strategies for factoring trinomials
	✓ explain the relationship between multiplication and factoring
5.4	✓ factor the difference of squares
	✓ factor perfect square trinomials

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 back to it during the chapter.	• During work on the chapter, have students keep track of what they need to work on in the What I Need to Work On section of their Foldable. 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 202 in *Mathematics 10* to activate student 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 polynomials and the skills of multiplying and factoring. You might provide the following prompts: • Have you ever seen or used polynomials before in your life? Where? • Have you ever taken something apart and put it back together again? How does that task relate to multiplying and factoring polynomials? • In what instances in your life have you performed a task over and over and found patterns in the process? • Can you describe anything from your life that resembles the operations of multiplying? factoring?	• Have students use the What I Need to Work On section of their Foldable 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.mhrmath10.ca book site.
Assessment *as* Learning	
Chapter 5 Foldable As students work on each section in Chapter 5, have them keep track of any problems they are having in the What I Need to Work On section of their Foldable.	• 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 into their Foldable. They 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 understanding of the chapter material. • Have students share their strategies for completing math calculations.

Chapter 5 Planning Chart

Section/ Suggested Timing	Prerequisite Skills	Materials/Technology	Teacher's Resource Blackline Masters	Exercise Guide	Assessment		
					Assessment *as* Learning	Assessment *for* Learning	Assessment *of* Learning
Chapter Opener • 45–60 min (TR page 159)	Students should be familiar with • Internet searches • word definitions • career searches	• one sheet of 11 × 17 paper • three sheets of 8.5 × 11 paper • scissors	BLM 5–1 Chapter 5 Self-Assessment BLM 5–2 Chapter 5 Prerequisite Skills BLM 5–4 Chapter 5 Unit 2 Project BLM U2–2 Unit 2 Project Checklist		TR page 158 Chapter 5 Foldable, TR page 158	TR page 158	
5.1 Multiplying Binomials • 100–120 min (TR page 161)	Students should be familiar with • algebra tiles • multiplication of two monomials • collection of like monomials using the operations of addition and subtraction	• algebra tiles	Master 5 Algebra Tiles (Positive Tiles) Master 6 Algebra Tiles (Negative Tiles) BLM 5–3 Chapter 5 Warm-Up BLM 5–4 Chapter 5 Unit 2 Project BLM 5–5 Section 5.1 Extra Practice	**Essential:** #1a), b), d), 2, 3a)–d), 4a)–c), 5, 6a), 8–10, 12, 18 **Typical:** #1b), e), f), 3c), e), f), 4b)–d), 5, 6b), c), 7–9, 11, 12, 14, 18 **Extension/Enrichment:** #1f), 3f), 4e), f), 6d), e), f), 8, 9, 17, 19	TR pages 164, 169 Chapter 5 Foldable, TR page 158	TR pages 166, 167, 169	
5.2 Common Factors • 100–150 min (TR page 170)	Students should be familiar with • factoring whole numbers • finding common factors and common multiples of whole numbers • dividing monomials by monomials • exponents • distributive property • problem solving strategies		BLM 5–3 Chapter 5 Warm-Up BLM 5–6 Section 5.2 Extra Practice	**Essential:** #1a), c), 2a), c), e), 3a), c), e), 4a), c), e), 5a), b), e), 6a), c), e), 7a), c), d), 8–10, 12, 14, 19 **Typical:** #1–3, 4c)–e), 5c–e), 6c)–e), 7, 9–11, 13, 15, 18 **Extension/Enrichment:** #1, 6, 7, 9, 12, 14, 16–19	TR pages 172, 177 Chapter 5 Foldable, TR page 158	TR pages 174, 175, 177	
5.3 Factoring Trinomials • 120–180 min (TR page 178)	Students should be familiar with • algebra tiles • area of rectangles • distributive property • grouping algebraic terms	• algebra tiles	Master 5 Algebra Tiles (Positive Tiles) Master 6 Algebra Tiles (Negative Tiles) BLM 5–3 Chapter 5 Warm-Up BLM 5–4 Chapter 5 Unit 2 Project BLM 5–7 Section 5.3 Extra Practice	**Essential:** #1a), b), 2a), b), 3a), c), 4a), c), f), 5a), b), d), f), 6a), d), f), 7a), h), 8a), 9a), 10a), 13, 14, 21, 22 **Typical:** #1a)–c), 2a–c), 3a)–c), 4b), d), e), f), 5c), e), f), 6b), c), e), 7b), c), d), f), j), 10, 11b), 13–15, 21, 22 **Extension/Enrichment:** #5f), 7e), h), 10–12, 14, 16–22	TR pages 180, 186 Chapter 5 Foldable, TR page 158	TR pages 184, 186	
5.4 Factoring Special Trinomials • 100–120 min (TR page 187)	Students should be familiar with • using grids to find area • algebra tiles • multiplication of binomials • square roots • factoring using common factors • factoring trinomials • recognizing patterns	• centimetre grid paper • scissors	Master 5 Algebra Tiles (Positive Tiles) Master 6 Algebra Tiles (Negative Tiles) BLM 5–3 Chapter 5 Warm-Up BLM 5–4 Chapter 5 Unit 2 Project BLM 5–8 Section 5.4 Extra Practice	**Essential:** #1–3, 5, 6, 7a) –c), 8a), b), 9, 10, 12, 13, 16, 20, 24, 25 **Typical:** #1–7, 8a), b), 9–13, 16, 20, 22, 24, 25 **Extension/Enrichment:** #8, 10, 12, 14, 15, 17–19, 21, 23, 26	TR pages 190, 197 Chapter 5 Foldable, TR page 158	TR pages 193, 196, 197	
Chapter 5 Review • 60–90 min (TR page 198)		• algebra tiles • rulers	Master 5 Algebra Tiles (Positive Tiles) Master 6 Algebra Tiles (Negative Tiles) BLM 5–5 Section 5.1 Extra Practice BLM 5–6 Section 5.2 Extra Practice BLM 5–7 Section 5.3 Extra Practice BLM 5–8 Section 5.4 Extra Practice	Have students do at least one question related to any concept, skill, or process that has been giving them trouble.	Chapter 5 Foldable, TR page 158	TR page 199	
Chapter 5 Practice Test • 45–60 min (TR page 200)		• algebra tiles • rulers	Master 5 Algebra Tiles (Positive Tiles) Master 6 Algebra Tiles (Negative Tiles) BLM 5–9 Chapter 5 Test	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, 3–10, 12, and 13.	TR page 201		TR page 201 BLM 5–9 Chapter 5 Test
Unit 2 Project • 60–90 min (TR page 202)		• coloured pencils and markers, coloured paper, scissors, glue, and other materials for artwork	Master 1 Project Rubric BLM U2–3 Unit 2 Project Final Report				TR page 203 Master 1 Project Rubric
Unit 2 Review and Test • 60–90 min (TR page 204)		• algebra tiles • rulers	BLM 5–10 Chapter 5 BLM Answers	Have students do at least one question related to any concept, skill, or process that has been giving them trouble.	Chapters 3, 4, and 5 Foldables	TR page 204	TR page 204