5 Introduction to Polynomials

General Outcomes

- Represent algebraic expressions in multiple ways.

Specific Outcomes

PR5 Demonstrate an understanding of polynomials (limited to polynomials of degree less than or equal to 2).

PR6 Model, record and explain the operations of addition and subtraction of polynomial expressions, concretely, pictorially and symbolically (limited to polynomials of degree less than or equal to 2).

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

Section	Understanding Concepts, Skills, and Processes
5.1	✓ use mathematical terminology to describe polynomials
	✓ create a model for a given polynomial expression
5.2	✓ use algebra tiles and diagrams to show whether expressions are equivalent
	✓ identify equivalent expressions that are polynomials
	✓ combine like terms in algebraic expressions
5.3	✓ model addition of polynomial expressions concretely or pictorially and record the process symbolically
	✓ model subtraction of polynomial expressions concretely or pictorially and record the process symbolically
	✓ apply a personal strategy for addition and subtraction of given polynomial expressions
	✓ solve problems using the addition and subtraction of polynomials

Assessment	Supporting Learning
Assessment *for* Learning	
Method 1: Use the Math Link introduction on page 173 in *MathLinks 9* 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 optical illusions and number tricks/ puzzles, including how they are similar and how they are different.	• **BLM 5–1 Chapter 5 Math Link Introduction** provides scaffolding for the Math Link introduction. • 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 the Get Ready materials available **BLM 5–2 Chapter 5 Get Ready**, in the *MathLinks 9 Practice and Homework Book*, and at the www.mathlinks9.ca book site.
Assessment *as* Learning	
Literacy Link (page 171) At the beginning of the chapter, work with students to model the use of a concept map.	• After completing an introduction to the chapter, have students brainstorm ideas about what sorts of information they may be including in their concept map as they progress through the chapter.
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.
Assessment *for* Learning	
BLM 5–3 Chapter 5 Warm-Up This BLM includes three warm-ups, one to be used at the beginning of each section. Each warm-up provides cumulative review questions for the entire student resource to that point, as well as mental math practice.	• As students complete questions from previous chapters, 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 mental math calculations.

Problems of the Week

Have all students try at least one of the problems on **BLM 5–4 Chapter 5 Problems of the Week**. Many of these problems require students to think outside the box and experiment with a variety of approaches. Some have definitive answers; others can be answered in more than one way.

Students can take the problems home and consult with parents or guardians, work with other students when their work is completed, or try them on their own. The questions take a varying amount of time to solve, depending on the particular student and the problem itself. You may wish to give out these problems at the beginning of the chapter and discuss the solutions at appropriate times throughout your work on the chapter.

Chapter 5 Planning Chart

Section/ Suggested Timing	Prerequisite Skills	Materials/Technology	Teacher's Resource Blackline Masters	Exercise Guide	Extra Support	Assessment		
						Assessment *as* Learning	Assessment *for* Learning	Assessment *of* Learning
Chapter Opener • 40–50 minutes (TR page 239)	Students should be familiar with • optical illusions • place value for ones and tens • addition, subtraction, and multiplication of whole numbers	• sheet of 11 × 17 paper • four sheets of 8.5 × 11 paper • ruler • scissors • stapler • two dice per pair of students	BLM 5–1 Chapter 5 Math Link Introduction BLM 5–2 Chapter 5 Get Ready BLM 5–4 Chapter 5 Problems of the Week		Online Learning Centre	TR page 238 Chapter 5 Foldable, TR page 238	TR page 238	
5.1 The Language of Mathematics • 80–100 minutes (TR page 243)	Students should be familiar with • common arithmetic words/phrases • writing an algebraic expression from a word statement • identifying and using dimensions associated with squares and rectangles	• concrete materials, such as algebra tiles	Master 2 Communication Peer Evaluation Master 11 Algebra Tiles (Positive Tiles) Master 12 Algebra Tiles (Negative Tiles) BLM 5–3 Chapter 5 Warm-Up BLM 5–5 Section 5.1 Extra Practice BLM 5–6 Section 5.1 Math Link	**Essential:** #2–4, 5, 7, 8, 12, 13, 15, 17, 20, 23, Math Link **Typical:** #2–4, 7, 9, 10, 12, 13, 17–19, 21–26, Math Link **Extension/Enrichment:** #2–4, 15, 21, 27–31	*MathLinks 9 Practice and Homework Book* *MathLinks 9 Solutions Manual*	Master 2 Communication Peer Evaluation TR pages 245, 254 Math Learning Log, TR page 254 Chapter 5 Foldable, TR page 254	TR pages 249, 254	
5.2 Equivalent Expressions • 100–120 minutes (TR page 255)	Students should be familiar with • finding the perimeter of a rectangle • terminology associated with algebraic expressions • identifying terms as part of algebraic expressions • modelling an algebraic expression with algebra titles or diagrams	• concrete materials, such as algebra tiles	Master 6 Square Dot Paper Master 7 Isometric Dot Paper Master 8 Centimetre Grid Paper Master 9 0.5 Centimetre Grid Paper Master 11 Algebra Tiles (Positive Tiles) Master 12 Algebra Tiles (Negative Tiles) BLM 5–3 Chapter 5 Warm-Up BLM 5–7 Section 5.2 Extra Practice BLM 5–8 Section 5.2 Math Link	**Essential:** #1, either 2 or 3, 4, 6, 8, 10, 12, 16, 17, 21, Math Link **Typical:** #1, 2, 4, 6–8, 11–13, 15–17, 19–22, Math Link **Extension/Enrichment:** #1–4, 18, 23–25	*MathLinks 9 Practice and Homework Book* *MathLinks 9 Solutions Manual*	TR pages 256, 264 Math Learning Log, TR page 264 Chapter 5 Foldable, TR page 264	TR pages 260, 264	
5.3 Adding and Subtracting Polynomials • 100–120 minutes (TR page 265)	Students should be familiar with • addition and subtraction of integers • modelling polynomials of degree 2 using algebra titles or diagrams • identifying like terms from a set of terms • naming the opposite of an integer	• concrete materials, such as algebra tiles	Master 11 Algebra Tiles (Positive Tiles) Master 12 Algebra Tiles (Negative Tiles) BLM 5–3 Chapter 5 Warm-Up BLM 5–9 Section 5.3 Extra Practice BLM 5–10 Section 5.3 Math Link	**Essential:** #1–4, 5, 6, 8, 10, 12, 14, 16–18, Math Link **Typical:** #1–3, 5, 6, 8, 10, 12, 14, 16–20, 24, Math Link **Extension/Enrichment:** #1–4, 13, 17, 20, 22, 23, 26–30	*MathLinks 9 Practice and Homework Book* *MathLinks 9 Solutions Manual*	TR pages 266, 274 Math Learning Log, TR page 274 Chapter 5 Foldable, TR page 274	TR pages 270, 274	
Chapter 5 Review • 40–50 minutes (TR page 275)		• concrete materials, such as algebra tiles	Master 6 Square Dot Paper Master 7 Isometric Dot Paper Master 8 Centimetre Grid Paper Master 9 0.5 Centimetre Grid Paper Master 11 Algebra Tiles (Positive Tiles) Master 12 Algebra Tiles (Negative Tiles) BLM 5–5 Section 5.1 Extra Practice BLM 5–7 Section 5.2 Extra Practice BLM 5–9 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.	*MathLinks 9 Practice and Homework Book* *MathLinks 9 CAB*		TR page 276	
Chapter 5 Practice Test • 40–50 minutes (TR page 277)		• concrete materials, such as algebra tiles	Master 6 Square Dot Paper Master 7 Isometric Dot Paper Master 8 Centimetre Grid Paper Master 9 0.5 Centimetre Grid Paper Master 11 Algebra Tiles (Positive Tiles) Master 12 Algebra Tiles (Negative Tiles) BLM 5–11 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, 2, 4–9, 11–14	*MathLinks 9 CAB*	TR page 276		TR page 278 BLM 5–11 Chapter 5 Test
Chapter 5 Math Link: Wrap It Up! • 60–80 minutes (TR page 279)			Master 1 Project Rubric BLM 5–1 Chapter 5 Math Link Introduction BLM 5–6 Section 5.1 Math Link BLM 5–8 Section 5.2 Math Link BLM 5–10 Section 5.3 Math Link BLM 5–12 Chapter 5 Math Link: Wrap It Up!		Online Learning Centre			TR page 281 Master 1 Project Rubric
Chapter 5 Challenge: Kayaks for Rent • 40–60 minutes (TR page 282)			Master 1 Project Rubric		Online Learning Centre		TR page 284	TR page 285 Master 1 Project Rubric
Chapter 5 Challenge: What Have You Got to Hide? • 40–50 minutes (TR page 286)		• calculator • computer with a spreadsheet program (optional)	Master 1 Project Rubric BLM 5–13 Chapter 5 BLM Answers		Online Learning Centre		TR page 287	TR page 288 Master 1 Project Rubric