Polynomials

Opener

***Mathematics 10,* pages 202–203**

Suggested Timing

45–60 min

Materials

- one sheet of 11× 17 paper
- three sheets of 8.5 × 11 paper
- scissors

Blackline Masters

BLM 5–2 Chapter 5 Prerequisite Skills
BLM 5–4 Chapter 5 Unit 2 Project
BLM U2–2 Unit 2 Project Checklist

Key Terms

binomial
trinomial
least common multiple
difference of squares
polynomial
distributive property
greatest common factor

What's Ahead

This chapter introduces students to multiplying and factoring polynomials. They will use algebra tiles to examine patterns when multiplying polynomials and use these patterns to better understand applying the distributive property to multiplying and factoring polynomials. Students will learn to recognize special products and use this knowledge to factor differences of squares and perfect square trinomials.

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

- multiply polynomials involving
  - monomials and polynomials
  - binomials and binomials
  - binomials and polynomials
- factor polynomials involving
  - common factors
  - trinomials of the form $ax^2 + bx + c$, $a = 1$
  - trinomials of the form $ax^2 + bx + c$, $a \neq 1$
  - differences of squares
  - perfect square trinomials
- recognize and understand the importance of patterns in mathematics and use these patterns to
  - develop understanding of concepts
  - develop skills and processes
  - solve problems in everyday life

Planning Notes

Unit Project

You might take the opportunity to discuss the Unit 2 project described in the Unit 2 opener on TR page 107. Throughout the chapter, there are individual questions for the unit project. These questions are not mandatory but are recommended because they provide some of the work needed for the final report for the Unit 2 project assignment.

The Unit 2 project is integrated throughout the chapter. You will find questions related to the project in the Check Your Understanding in sections 5.1, 5.3, and 5.4.

Foldables™ Study Tool

Discuss with students the benefits of keeping a summary of what they are learning in the chapter. If they have used Foldables before, you may wish to have them report on how useful they found various designs.

- What designs have they used?
- Which designs were the most useful?
- Which, if any, designs were hard to use?
- What disadvantages do Foldables have?
- What other method(s) could they use to summarize their learning?

Discuss the Foldable design on page 203 and how it might be used to summarize Chapter 5. Encourage students to suggest revisions for this Foldable, or to replace this Foldable with another design of their choice. Allowing personal choice in this way will increase student ownership in their work.

Give students time to develop the summary method they have chosen. Ask them to include some method of keeping track of what they need to work on; discuss the advantage of doing this.

Ensure that students understand the difference between multiplying and factoring, and point out that the labels for these two processes appear on opposite sides of the Foldable. On the left side of the Foldable, students could focus on methods of multiplying. On the right side, students could focus on the factoring of polynomials. The centre of the Foldable provides ample space for students to model concretely the multiplication and factoring of polynomials.

Suggest that students draw and colour an example of both multiplication and factoring. Encourage students to write in their own words what each term and process is and to generate examples different from those in the student resource.

The Foldable accommodates alternative methods of multiplying. If you introduce alternative methods, use the same question throughout so that students focus only on the difference in methodology. For example, for the product of $(2x + 1)(x + 2)$, have students complete the product using algebra-tile models in the centre of their Foldable, using the distribution method, and using one or more alternative methods.

As students progress through the chapter, provide time for them to keep track of what they need to work on. This will assist them in identifying and solving any difficulties with concepts, skills, and processes. Have them check off each item as they deal with it.

Meeting Student Needs

- Consider having students complete the questions on **BLM 5–2 Chapter 5 Prerequisite Skills** to activate the prerequisite skills for this chapter.
- Post the student learning outcomes for the entire chapter for students to refer to.
- Hand out to students **BLM U2–2 Unit 2 Project Checklist**, which provides a list of all of the requirements for the Unit 2 project.
- **BLM 5–4 Chapter 5 Unit 5 Project** includes all of the unit project questions for this chapter. These questions provide a beginning for the Unit 2 project.
- Some students may benefit from completing all unit project questions.
- Read the chapter opener as a class and then have students restate the Chinese quotation, using a reference that is more familiar to them. For example, students in the North might say, "three good furs, two mediocre furs, and one poor fur are sold for $300."
- Have students create posters illustrating the Key Terms for the entire chapter. Have students research the definition for each Key Term and create a representation for each definition.
- With the class, read the information about the Recreation Facilities Manager and ask students questions like the following:
  - Who does this job in our community?
  - What is the job title in our community?
  - Is this a job you might like to have?
- Have a class discussion about how the career of Recreation Facilities Manager connects to the chapter.

Enrichment

- To get students thinking in terms of polynomials, challenge them to find a polynomial that describes the process of going from wholesale cost to final cost including taxes. Ask them how this polynomial might be used to develop a spreadsheet that a retailer might use.

Gifted

- After students have read the information about the Recreation Facilities Manager, ask them to think about formulas that might apply to the creation of recreational projects such as pools, ice rinks, and play areas. These formulas might include those for area, volume, and length. Ask students to speculate how an engineer might use these formulas during the design process. Encourage them also to explore the engineering of winter sport facilities such as bobsled tracks, ski jumps, and half pipes.

Career Connection

Invite students who are interested in a career in recreation to research the training and qualifications, employment opportunities, and career longevity of recreation workers. Have them explore newspapers, the Internet, and local town and city employment offices to see what recreation career opportunities exist in their local area. They should also research what other career choices would involve the same set of skills of scheduling facilities and staff, maintaining budget responsibilities, and improving the lifestyle of the community. How would strong math skills help in scheduling staff, maintaining the facility, controlling the budget, and scheduling community use of the recreation facility?

Web Link

For definitions of some of the terms in this chapter, go to www.mhrmath10.ca and follow the links.