# 5.1 Expand Binomials

**Student Text Pages**
234–241

**Suggested Timing**
80 min

**Tools**
- algebra tiles
- Computer Algebra Systems (CAS)

**Related Resources**
BLM 5-3 Section 5.1 Expand Binomials
BLM T-5 CAS on the TI-89 Calculator

## Link to Prerequisite Skills

In this section, students expand and simplify the product of two binomials. Students should complete Prerequisite Skills questions 1 to 4, and 8 before proceeding with this section.

### Warm-Up

**1.** Expand.

**a)** $3(4x + 8)$ **b)** $-8(7x + 9)$ **c)** $-5(2x - 6)$ **d)** $3x(4x + 8)$

**Warm-Up Answers**

**1. a)** $12x + 24$ **b)** $-56x - 72$ **c)** $10x + 30$ **d)** $12x^2 + 24x$

## Teaching Suggestions

### Warm-Up

- Write the Warm-Up questions on the board or on an overhead. Have students complete the questions independently. Then, discuss the solutions as a class.

### Section Opener

- Discuss the introduction as a class. Have students verbalize the process used to multiply a pair of two-digit numbers.

### Investigate

- You may want to review how to use algebra tiles before students begin working on the Investigate.
- Have students work in pairs to complete the Investigate. This allows them to discuss their results.

**Investigate Answers (page 235)**

**1. a)** $x + 2$, $x + 3$ **b)** $x^2 + 5x + 6$

**2. a)** $2x^2 + 2x$, $3x + 3$ **b)** $2x^2 + 5x + 3$

**3.** The expression for the area is the same as the two expressions for the dimensions multiplied together.

### Examples

- Have students work through the Examples as a class before proceeding to the Discuss the Concepts. Alternatively, have students complete the Examples independently or in small groups before reviewing them as a class.
- For Example 1, ensure students understand that the acronym FOIL only applies to the product of two binomials. If students understand the distributive property and/or the multiplication pattern, they can find products with more complex factors.

- If you plan to let students use a Computer Algebra System, you may want to distribute copies of **BLM T-5 CAS on the TI-89 Calculator** so they can learn some basic skills with this tool.
- Some students may wish to use algebra tiles to find the products in Example 2. In general, algebra tiles are not used to represent factors that contain negative values.

### Key Concepts

- Review with students the different methods that can be used to multiply two binomials.

### Discuss the Concepts

- Have the students work with a partner to answer these questions. Discuss the answers as a class before moving on to the exercises.

**Discuss the Concepts Suggested Answers (page 238)**

**D1.** Answers may vary.

**D2.** Using an area model can help visualize how a binomial is expanded using a multiplication pattern. The sum of the areas of the small rectangles is the area of the large rectangle.

### Practise (A)

- Encourage students to refer to the Examples before asking for assistance.
- Some students may find it helps to use algebra tiles to complete **question 3**.
- Students should recognize the products from **question 6** are differences of squares and the products from **question 7** are perfect square trinomials.

### Apply (B)

- For **question 11**, students should break up the area into rectangles. They should find the area of each rectangle then add or subtract to find the area of the irregular shape.
- **Question 12** links to the Chapter Problem. Remind students to keep the solution to this question handy as the methods they used may help them with the Chapter Problem Wrap-Up.
- **Question 13** is a Literacy Connect. You may wish to assign this question as a journal entry or to discuss the question as a class. Literacy Connect questions offer the opportunity to explore literacy issues in the mathematics classroom and within the context of mathematics.

### Extend (C)

- Assign the Extend questions to students who are not being challenged by the questions in Apply.
- For **question 16**, students apply the distributive property to find products with one or more trinomial factors.
- In **question 17**, students apply the patterns seen with perfect square trinomials and differences of squares to factor trinomials.

### Literacy Connections

- In their journals, have students describe the different methods that can be used to find the product of two binomials.

## Common Errors

- Some students may forget to include the negative signs when multiplying binomials. For example, they may think $(4x - 5)(3x - 8) = 12x^2 - 32x - 15x - 40$. The expanded form should be $12x^2 - 32x - 15x + 40$.

**$R_x$** Have students remember that each term is multiplied including the sign at the front of that term. (i.e. the second term in the first binomial is –5).

## Accommodations

**Memory**—place a description and diagram of FOIL on the word wall

**Visual**—provide students with assistance with reading questions 10 to 13

**Spatial**—provide handouts with algebra tile diagrams the same size as the tile set you are using in the classroom

**Perceptual**—encourage students to use algebra tiles for the exercises

**Gifted and Enrichment**—prepare a display for the word wall that outlines the pattern for expanding a difference of squares

## Mathematical Process Expectations

| Process Expectation | Questions |
|---|---|
| Problem Solving | 12, 15 |
| Reasoning and Proving | 1, 8, 17 |
| Reflecting | 8 |
| Selecting Tools and Computational Strategies | 2–7, 9–17 |
| Connecting | 12, 13 |
| Representing | 1, 9, 12 |
| Communicating | 8, 13 |

## Ongoing Assessment

- While students are working, circulate and see how well each person works. This may be an opportunity to continue observing and recording individual students' learning skills.

## Extra Practice

- Use **BLM 5-3 Section 5.1 Expand Binomials** for remediation or extra practice.