



# Multiplying Expressions

Let's explore multiplication strategies.

## 8.1

## Worked Example: Multiplying Binomials

Rewrite 5 and 15 as binomials, and multiply the binomials, using a diagram.

Step 1:  $5 = 10 - 5$  and  $15 = 10 + 5$ , so  $5 \cdot 15 = (10 - 5) \cdot (10 + 5)$

Step 2:

|    |    |    |
|----|----|----|
|    | 10 | -5 |
| 10 |    |    |
| 5  |    |    |

Step 3:

|    |     |     |
|----|-----|-----|
|    | 10  | -5  |
| 10 | 100 | -50 |
| 5  | 50  | -25 |

Step 4:  $100 - 50 + 50 - 25 = 75$

## 8.2 A Method for Multiplying

Here is a method for multiplying 97 and 103:

97 is  $100 - 3$

103 is  $100 + 3$

So  $97 \cdot 103 = (100 - 3)(100 + 3)$

|     |        |      |
|-----|--------|------|
|     | 100    | -3   |
| 100 | 10,000 | -300 |
| 3   | 300    | -9   |

1. Explain how this diagram is used to compute  $97 \cdot 103 = 9,991$ .
2. Draw a similar diagram that helps you mentally compute  $(30 + 1)(30 - 1)$ . What is the result?  
What multiplication problem did you just solve?
3. Use this method to compute:
  - a.  $7 \cdot 13$
  - b.  $102 \cdot 98$
  - c.  $995 \cdot 1,005$



## 8.3 Find the Missing Pieces

Complete each diagram. Write some equivalent expressions based on the diagram.

1.

|    |     |   |
|----|-----|---|
|    |     | 7 |
| 10 |     |   |
| -7 | -70 |   |

2.

|     |     |   |
|-----|-----|---|
|     | $x$ | 8 |
| $x$ |     |   |
| -8  |     |   |

3.

|   |     |       |
|---|-----|-------|
|   | $a$ | -9    |
|   |     | $-9a$ |
| 9 |     |       |

4.

|     |       |                |
|-----|-------|----------------|
|     | $b$   | $\frac{1}{2}$  |
| $b$ | $b^2$ |                |
|     |       | $-\frac{1}{4}$ |

5.

|     |    |        |
|-----|----|--------|
|     | 7  |        |
| $c$ |    | $-c^2$ |
| 7   | 49 |        |