Activity

7-5 Factoring $x^2 + bx + c$

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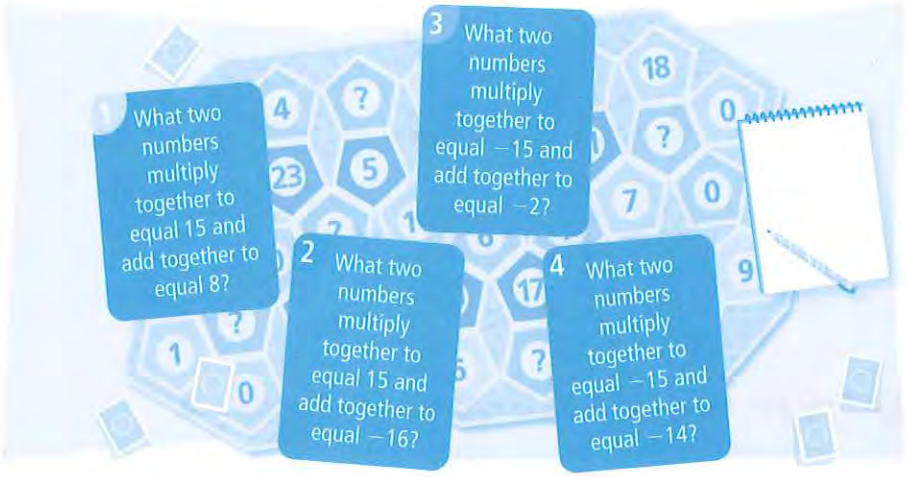
EXPLORE & REASON

Consider the following puzzles.



A. Find the solutions to the four puzzles shown.

B. **Look for Relationships** Write as set of four number puzzles of your own that have the same structure as these four. Describe the pattern. © MP.7

HABITS OF MIND

Make Sense and Persevere Can you choose any pair of integers to create a solvable puzzle? Explain. © MP.1

EXAMPLE 1 **Try It! Understand Factoring a Trinomial**

1. Write the factored form of each trinomial.

a. $x^2 + 13x + 36$

b. $x^2 + 11x + 28$

EXAMPLE 2 **Try It! Factor $x^2 + bx + c$, When $b < 0$ and $c > 0$**

2. Write the factored form of each trinomial.

a. $x^2 - 8x + 5$

b. $x^2 - 13x + 42$

EXAMPLE 3 **Try It! Factor $x^2 + bx + c$, When $c < 0$**

3. Write the factored form of each trinomial.

a. $x^2 - 5x - 14$

b. $x^2 + 6x - 16$

HABITS OF MIND

Use Structure If both b and c are negative, will the factors both be negative? Explain. MP.7

Notes

Assess

EXAMPLE 4 Try It! Factor a Trinomial With Two Variables

4. Write the factored form of each trinomial.

a. $x^2 + 12xy + 32y^2$

b. $x^2 - 10xy + 21y^2$

EXAMPLE 5 Try It! Apply Factoring Trinomials

5. What would be the dimensions of the larger wall area you would need if you used 11 of the 1 ft-by-1 ft units while keeping the other units the same?

HABITS OF MIND

Model With Mathematics How might factoring a trinomial into a pair of binomial factors relate to a situation in a physical world? MP.4

Do You UNDERSTAND?

1. **ESSENTIAL QUESTION** How does recognizing patterns in the signs of the terms help you factor polynomials?

2. **Error Analysis** A student says that since $x^2 - 5x - 6$ has two negative terms, both factors of c will be negative. Explain the error the student made. **MP.3**

3. **Reason** What is the first step to factoring any trinomial? Explain. **MP.2**

4. **Communicate Precisely** To factor a trinomial $x^2 + bx + c$, why do you find the factors of c and not b? Explain. **MP.6**

Do You KNOW HOW?

List the factor pairs of c for each trinomial.

5. $x^2 + 17x + 16$

6. $x^2 + 4x - 21$

For each trinomial, tell whether the factor pairs of c will be both positive, both negative, or opposite signs.

7. $x^2 - 11x + 10$

8. $x^2 + 9x - 10$

9. Complete the table for factoring the trinomial $x^2 - 7x + 12$.

Factors of 12	Sum of Factors
−1 and −12	?
?	−7
−2 and −6	−8