Name _____ Date _____

7.5 Factoring $x^2 + bx + c$

For use with Exploration 7.5

Essential Question How can you use algebra tiles to factor the trinomial $x^2 + bx + c$ into the product of two binomials?

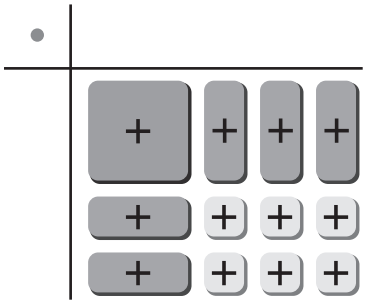
1 EXPLORATION: Finding Binomial Factors

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

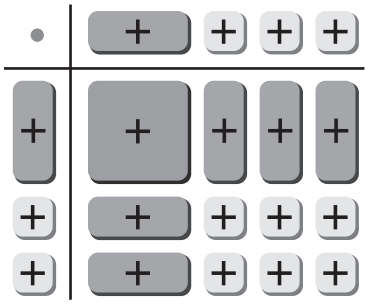
Work with a partner. Use algebra tiles to write each polynomial as the product of two binomials. Check your answer by multiplying.

Sample $x^2 + 5x + 6$

Step 1 Arrange algebra tiles that model $x^2 + 5x + 6$ into a rectangular array.



Step 2 Use additional algebra tiles to model the dimensions of the rectangle.

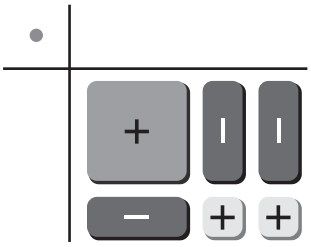


Step 3 Write the polynomial in factored form using the dimensions of the rectangle.

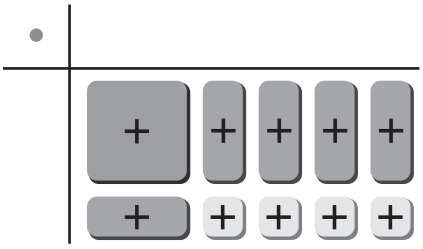
width length

Area $= x^2 + 5x + 6 = (x + 2)(x + 3)$

a. $x^2 - 3x + 2 =$ _____



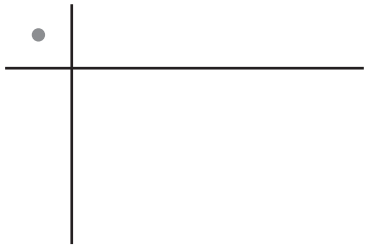
b. $x^2 + 5x + 4 =$ _____



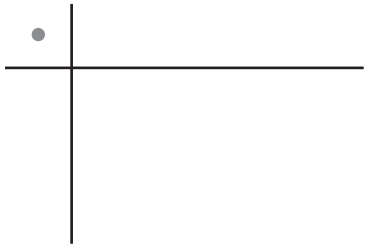
7.5 Factoring $x^2 + bx + c$ (continued)

1 EXPLORATION: Finding Binomial Factors (continued)

c. $x^2 - 7x + 12 =$ _____



d. $x^2 + 7x + 12 =$ _____



Communicate Your Answer

2. How can you use algebra tiles to factor the trinomial $x^2 + bx + c$ into the product of two binomials?

3. Describe a strategy for factoring the trinomial $x^2 + bx + c$ that does not use algebra tiles.

Name _____ Date _____

7.5 Notetaking with Vocabulary

For use after Lesson 7.5

In your own words, write the meaning of each vocabulary term.

polynomial

FOIL Method

Zero-Product Property

Core Concepts

Factoring $x^2 + bx + c$ When c Is Positive

Algebra $x^2 + bx + c = (x + p)(x + q)$ when $p + q = b$ and $pq = c$.

When c is positive, p and q have the same sign as b.

Examples $x^2 + 6x + 5 = (x + 1)(x + 5)$

$x^2 - 6x + 5 = (x - 1)(x - 5)$

Notes:

Factoring $x^2 + bx + c$ When c Is Negative

Algebra $x^2 + bx + c = (x + p)(x + q)$ when $p + q = b$ and $pq = c$.

When c is negative, p and q have different signs.

Example $x^2 - 4x - 5 = (x + 1)(x - 5)$

Notes:

Name_____ Date _____

7.5 Notetaking with Vocabulary (continued)

Extra Practice

In Exercises 1–12, factor the polynomial.

1. $c^2 + 8c + 7$

2. $a^2 + 16a + 64$

3. $x^2 + 11x + 18$

4. $d^2 + 6d + 8$

5. $s^2 + 11s + 10$

6. $u^2 + 10u + 9$

7. $b^2 + 3b - 54$

8. $y^2 - y - 2$

9. $u^2 + 3u - 18$

10. $z^2 - z - 56$

11. $h^2 + 2h - 24$

12. $f^2 - 3f - 40$

Name _____ Date _____

7.5 Notetaking with Vocabulary (continued)

In Exercises 13–18, solve the equation.

13. $g^2 - 13g + 40 = 0$

14. $k^2 - 5k + 6 = 0$

15. $w^2 - 7w + 10 = 0$

16. $x^2 - x = 30$

17. $r^2 - 3r = -2$

18. $t^2 - 7t = 8$

19. The area of a right triangle is 16 square miles. One leg of the triangle is 4 miles longer than the other leg. Find the length of each leg.

20. You have two circular flower beds, as shown. The sum of the areas of the two flower beds is 136π square feet. Find the radius of each bed.