NAME _____ DATE _____

Module 12 Simplifying Algebraic Expressions by Factoring Polynomials
Lesson 5 Factoring $ax^2 + bx + c$

Factor.

1. $2x^2 + 9x + 7$

2. $3x^2 + 8x + 5$

3. $5x^2 + 11x + 2$

4. $7x^2 + 2x + 5$

5. $4x^2 + 13x + 3$

6. $7x^2 - 4x - 3$

7. $11x^2 - 6x - 5$

8. $5x^2 - 14x - 3$

9. $13x^2 - 2x - 15$

10. $5x^2 + 2x - 7$

11. $17x^2 + 33x - 2$

12. $3x^2 - 10x + 3$

13. $5x^2 - 12x + 7$

14. $2x^2 + x - 3$

15. $8x^2 + 2x - 15$

16. $5x^2 + 7x - 24$

17. $9x^2 + 24x + 16$

18. $2x^2 - x - 3$

19. $12x^2 - 23x + 5$

20. $7x^2 - 16x + 9$

Journal

1. Aaron insists that the factored form of $4x^2 - 12x + 5$ is $(2x + 1)(2x + 5)$. Explain what Aaron did correctly, but why his factorization is incorrect. What would the trinomial need to be for his factorization to be correct?
2. Create a trinomial of the form $ax^2 + bx + c$, where $b > 0$ and $c > 0$, and a and c are prime. Explain each step for factoring it.
3. Bruce thinks the only way to factor $6x^2 + 11x + 4$ is to use the traditional method of finding the factor pairs of the first term, to separate the pairs into two binomials, and then, to use *guess-and-check* with factor pairs of the third term to see what works. Explain to Bruce another way to factor this trinomial.
4. Can a trinomial whose first term is negative be factored into a product of two binomials? Explain your answer using an example.

Cumulative Review

Simplify.

1. $8f + 20$

2. $15m^2 - 15m - 40$

3. $7s^2t + 3s - 10t$

4. $18a^3b^4 + 9a^2b^3 - 12a^2b^2$

5. $gh - 4g + 2h - 8$

6. $xz + 6x - yz - 6y$

7. $16r^2 - 12r - 12r + 9$

8. $9m^2 - 16n^2$

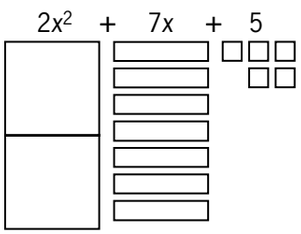
9. $x^2 + 21x + 38$

10. $x^2 + 15x - 54$

Manipulatives

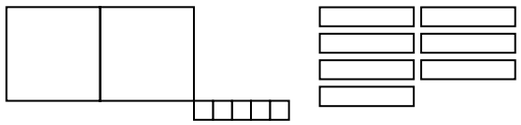
Use algebra tiles to factor. $2x^2 + 7x + 5$ with tiles. Begin by modeling the trinomial.

Figure 1



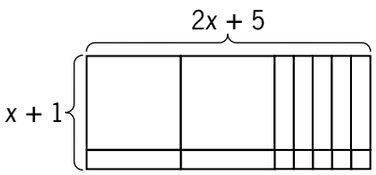
Put the x^2-squares in a row and then arrange the 1's tiles, so they form a rectangle. Because five is a prime number, the only rectangle that can be formed is a 1×5 rectangle. Now arrange the tiles so the lower, right corner of the x^2's rectangle and the upper left corner of the 1's rectangle are touching.

Figure 2



Finally, fill in the *x*-rectangles above and to the left of the 1-squares to form a rectangle. All tiles should be used in forming a rectangle. If there are too few *x*-rectangles or if there are *x*-rectangles left over, try adding zero pairs, or start over with a different configuration of 1's tiles.

Figure 3



$2x^2 + 7x + 5 = (2x \quad + 5)(x + 1)$

Use algebra tiles to simplify the following:

1. $6x^2 + 7x + 2$ _____

2. $5x^2 - 8x - 4$ _____

3. $4x^2 - 2x - 6$ _____

4. $4x^2 - 8x - 12$ _____