NAME _____ DATE _____ PERIOD ____

8-3 Study Guide and Intervention

Factoring Trinomials: $x^2 + bx + c$

Factor $x^2 + bx + c$ To factor a trinomial of the form $x^2 + bx + c$, find two integers, m and n, whose sum is equal to b and whose product is equal to c.

Factoring $x^2 + bx + c$	$x^2 + bx + c = (x + m)(x + n)$, where $m + n = b$ and $mn = c$.

Example 1 **Factor each trinomial.**

a. $x^2 + 7x + 10$

In this trinomial, $b = 7$ and $c = 10$.

Factors of 10	Sum of Factors
1, 10	11
2, 5	7

Since $2 + 5 = 7$ and $2 \cdot 5 = 10$, let $m = 2$ and $n = 5$.

$x^2 + 7x + 10 = (x + 5)(x + 2)$

b. $x^2 - 8x + 7$

In this trinomial, $b = -8$ and $c = 7$. Notice that $m + n$ is negative and mn is positive, so m and n are both negative. Since $-7 + (-1) = -8$ and $(-7)(-1) = 7$, $m = -7$ and $n = -1$.

$x^2 - 8x + 7 = (x - 7)(x - 1)$

Example 2 **Factor $x^2 + 6x - 16$.**

In this trinomial, $b = 6$ and $c = -16$. This means $m + n$ is positive and mn is negative. Make a list of the factors of -16, where one factor of each pair is positive.

Factors of -16	Sum of Factors
1, -16	-15
-1, 16	15
2, -8	-6
-2, 8	6

Therefore, $m = -2$ and $n = 8$.

$x^2 + 6x - 16 = (x - 2)(x + 8)$

Exercises

Factor each trinomial.

1. $x^2 + 4x + 3$
2. $m^2 + 12m + 32$
3. $r^2 - 3r + 2$
4. $x^2 - x - 6$
5. $x^2 - 4x - 21$
6. $x^2 - 22x + 121$
7. $c^2 - 4c - 12$
8. $p^2 - 16p + 64$
9. $9 - 10x + x^2$
10. $x^2 + 6x + 5$
11. $a^2 + 8a - 9$
12. $y^2 - 7y - 8$
13. $x^2 - 2x - 3$
14. $y^2 + 14y + 13$
15. $m^2 + 9m + 20$
16. $x^2 + 12x + 20$
17. $a^2 - 14a + 24$
18. $18 + 11y + y^2$
19. $x^2 + 2xy + y^2$
20. $a^2 - 4ab + 4b^2$
21. $x^2 + 6xy - 7y^2$