NAME_____ DATE _____

Study Guide

Factoring Trinomials

To factor a trinomial of the form $ax^2 + bx + c$, follow Example 1 below.

Example 1: Factor $2d^2 + 15d + 18$.
The product of 2 and 18 is 36.
You need to find two integers
whose *product* is 36 and
whose *sum* is 15.

Factors of 36	Sum of Factors
1, 36	$1 + 36 = 37$
2, 18	$2 + 18 = 20$
3, 12	$3 + 12 = 15$

$$2d^2 + 15d + 18 = 2d^2 + (12 + 3)d + 18$$
$$= 2d^2 + 12d + 3d + 18$$
$$= (2d^2 + 12d) + (3d + 18)$$
$$= 2d(d + 6) + 3(d + 6) \quad \textbf{Factor the GCF from each group.}$$
$$= (2d + 3)(d + 6) \quad \textbf{Use the distributive property.}$$

To factor a trinomial of the form given above when $a = 1$, you need to find only the factors of c whose sum is b.

Example 2: Factor $x^2 + 7x + 10$.

Since 2 and 5 are factors of 10 whose sum is 7,
$x^2 + 7x + 10 = (x + 2)(x + 5)$.

The same pattern can be used to factor a trinomial $ax^2 + bx + c$ when $a = 1$ and c is negative. When this occurs, the factors of the trinomial are a *difference* and a *sum*.

Complete.

1. $x^2 - 5x - 14 = (x + \underline{\quad})(x - 7)$

2. $a^2 + 13a + 36 = (a + 9)(a \underline{\quad} 4)$

3. $p^2 - 25 = (p + 5)(p \underline{\quad}\,\underline{\quad})$

4. $x^2 - 6xy - 16y^2 = (x \underline{\quad}\,\underline{\quad})(x + 2y)$

5. $49 - n^2 = (7 \underline{\quad}\,\underline{\quad})(\underline{\quad}\,\underline{\quad}n)$

6. $a^4 + 3xa^2 - 10x^2 = (a^2 - \underline{\quad})(\underline{\quad}\,\underline{\quad}5x)$

Factor each trinomial, if possible. If the trinomial cannot be factored using integers, write <u>prime</u>.

7. $x^2 + 12y + 32$

8. $x^2 - x - 6$

9. $x^2 - 4x - 21$

10. $y^2 + 22y + 121$

11. $9 - 7n + n^2$

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

13. $3x^2 + 2x - 8$

14. $18h^2 - 27h - 5$

15. $28x^2 + 60x - 25$

16. $48x^2 + 22x - 15$

17. $-4y^2 + 19y - 21$

18. $6a^2 - 7a + 18$