Name _____ Date _____

CHAPTER 8

Prime Trinomials of the Form $ax^2 + bx + c$

Recall that when factoring trinomials of the form $ax^2 + bx + c$, factors of both a and c must be combined to have a sum equaling b.

KEY CONCEPT

Prime Trinomials

A trinomial of the form $ax^2 + bx + c$ is prime if there is no integer factor combination of a and c whose sum equals b.

EXAMPLE

Identify prime trinomials of the form $ax^2 + bx + c$

Factor the trinomial $3x^2 + 5x - 4$, if possible.

Solution:

Combine factors of a and c to find a sum equaling b.

Factors of 3	Factors of −4	Possible factorization	Middle term when multiplied
1, 3	1, −4	$(x + 1)(3x - 4)$	$-4x + 3x = -x$
1, 3	−1, 4	$(x - 1)(3x + 4)$	$4x - 3x = x$
1, 3	4, −1	$(x + 4)(3x - 1)$	$-x + 12x = 11x$
1, 3	−4, 1	$(x - 4)(3x + 1)$	$x - 12x = -11x$
1, 3	2, −2	$(x + 2)(3x - 2)$	$-2x + 6x = 4x$
1, 3	−2, 2	$(x - 2)(3x + 2)$	$2x - 6x = -4x$

Since no combination of the factors of $3x^2$ and -4 sum to a middle term of $5x$, the trinomial is prime. ■

Note it can be concluded that a trinomial is prime only after all possible combinations of the factors of ax^2 and c have been tried and none sum to bx.

Practice

Show that the trinomial is prime.

1. $2x^2 + 14x + 7$ **2.** $3g^2 + 15g + 6$ **3.** $5y^2 - 11y + 9$

4. $4s^2 - 6s - 1$ **5.** $-3p^2 + 8p - 8$ **6.** $-2q^2 - 9q + 10$

Factor the trinomial, if possible. Otherwise write *prime*.

7. $3n^2 + n + 1$ **8.** $7d^2 + 14d + 2$ **9.** $4v^2 + 13v + 5$

10. $-k^2 - 6k + 6$ **11.** $8m^2 + 19m - 3$ **12.** $-4w^2 - 7w + 15$

13. $5z^2 - z - 7$ **14.** $-2h^2 + 21h - 12$ **15.** $6j^2 - 7j - 3$