

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

(Pages 440–444)

You can also use the FOIL method to help factor trinomials in which the coefficient of  $x^2$  is a number other than 1.

**EXAMPLE**Factor  $6x^2 - 22x - 8$ .

First, check for a GCF.

$$6x^2 - 22x - 8 = 2(3x^2 - 11x - 4) \quad \text{The GCF of the terms is 2. Use the Distributive Property.}$$

Now factor  $3x^2 - 11x - 4$ . $3x^2$  is the product of the **F**irst terms, and  $-4$  is the product of the **L**ast terms.

$$3x^2 - 11x - 4 = (3x + \blacksquare)(x + \blacksquare)$$

Find integers whose product is  $-4$ . Try factor pairs of  $-4$  until the sum of the products of the **O**uter and **I**nner terms is  $-11x$ .

$$\begin{aligned} \text{Try } -1 \text{ and } 4. \quad (3x - 1)(x + 4) &= 3x^2 + 12x - x - 4 \\ &= 3x^2 + 11x - 4 \quad 11x \text{ is not the correct middle term.} \end{aligned}$$

$$\begin{aligned} \text{Try } 1 \text{ and } -4 \quad (3x + 1)(x - 4) &= 3x^2 - 12x + x - 4 \\ &= 3x^2 - 11x - 4 \quad -11x \text{ is the correct middle term.} \end{aligned}$$

$$\text{Therefore, } 6x^2 - 22x - 8 = 2(3x + 1)(x - 4).$$

**PRACTICE**

Factor each trinomial. If the trinomial cannot be factored, write prime.

- |                      |                        |                       |
|----------------------|------------------------|-----------------------|
| 1. $2y^2 + 11y + 15$ | 2. $4n^2 + 3n - 7$     | 3. $6k^2 + 4k - 2$    |
| 4. $7w^2 - 11w + 4$  | 5. $3b^2 - 10b - 25$   | 6. $5n^2 - 22n + 8$   |
| 7. $3a^2 - 8a - 3$   | 8. $4m^2 + 2m - 5$     | 9. $8y^2 + 13y + 5$   |
| 10. $2x^2 + x - 6$   | 11. $10h^2 - 34h + 12$ | 12. $3n^2 - 5n - 8$   |
| 13. $2x^2 + 3x - 20$ | 14. $9x^2 - 18x + 5$   | 15. $20x^2 + 17x + 3$ |
| 16. $8g^2 - 4g - 12$ | 17. $8y^2 - 14y - 4$   | 18. $6m^2 - m - 15$   |

19. **Geometry** The area of a rectangle is  $(6x^2 + 7x + 2)$  square inches. Find binomial expressions to represent the dimensions of this rectangle.



20. **Standardized Test Practice** Factor the trinomial  $3x^2 - 13x - 10$ .

- A**  $(3x + 10)(x - 1)$     **B**  $(3x - 1)(x + 10)$     **C**  $(3x - 5)(x + 2)$     **D**  $(3x + 2)(x - 5)$

20. D

Answers: 1.  $(2y + 5)(y + 3)$  2.  $(4n + 7)(n - 1)$  3.  $2(3k - 1)(k + 1)$  4.  $(7w - 4)(w - 1)$  5.  $(3b + 5)(b - 5)$  6.  $(5n - 2)(n - 4)$  7.  $(3a + 1)(a - 3)$  8. prime 9.  $(8y + 5)(y + 1)$  10.  $(2x - 3)(x + 2)$  11.  $2(5h - 2)(h - 3)$  12.  $(3n - 8)(n + 1)$  13.  $(2x - 5)(x + 4)$  14.  $(3x - 1)(3x - 5)$  15.  $(4x + 1)(5x + 3)$  16.  $(4g + 4)(2g - 3)$  17.  $2(4y + 1)(y - 2)$  18.  $(2m + 3)(3m - 5)$  19.  $3x + 2$  by  $2x + 1$