

## 8-5

**Reteaching**Factoring  $x^2 + bx + c$ 

If a trinomial of the form  $x^2 + bx + c$  can be written as the product of two binomials, then:

- The coefficient of the  $x$ -term in the trinomial is the sum of the constants in the binomials.
- The trinomial's constant term is the product of the constants in the binomials.

**Problem**

What is the factored form of  $x^2 + 12x + 32$ ?

To write the factored form, you are looking for two factors of 32 that have a sum of 12.

**Solve** Make a table showing the factors of 32.

Factors of 32	Sum of Factors
1 and 32	33
2 and 16	18
4 and 8	12

$$x^2 + 12x + 32 = (x + 4)(x + 8)$$

**Check**

$$(x + 4)(x + 8)$$

$$x^2 + 8x + 4x + 32$$

Use FOIL Method.

$$x^2 + 12x + 32$$

Combine the like terms.

Solution: The factored form of  $x^2 + 12x + 32$  is  $(x + 4)(x + 8)$ .

**Exercises**

**Factor each expression.**

1.  $x^2 + 9x + 20$

2.  $y^2 + 12y + 35$

3.  $z^2 + 8z + 15$

4.  $a^2 + 11a + 28$

5.  $b^2 + 10b + 16$

6.  $c^2 + 12c + 27$

7.  $d^2 + 6d + 5$

8.  $e^2 + 15e + 54$

9.  $f^2 + 11f + 24$

Some factorable trinomials in the form of  $x^2 + bx + c$  will have negative coefficients. The rules for factoring are the same as when the  $x$ -term and the constant are positive.

- The coefficient of the  $x$ -term of the trinomial is the sum of the constants in the binomials.
- The trinomial's constant term is the product of the constants in the binomials.

However, one or both constants in the binomial factors will be negative.

### Problem

What is the factored form of  $x^2 - 3x - 40$ ?

To write the factored form, you are looking for two factors of  $-40$  that have a sum of  $-3$ . The negative constant will have a greater absolute value than the positive constant.

**Solve**      Make a table showing the factors of  $-40$ .

Factors of $-40$	Sum of Factors
1 and $-40$	$-39$
2 and $-20$	$-18$
4 and $-10$	$-6$
5 and $-8$	$-3$

$$x^2 - 3x - 40 = (x - 8)(x + 5)$$

**Check**

$$(x - 8)(x + 5)$$

$$x^2 + 5x - 8x - 40$$

Use FOIL Method.

$$x^2 + (-3x) - 40$$

Combine the like terms.

Solution: The factored form of  $x^2 - 3x - 40$  is  $(x - 8)(x + 5)$ .

### Exercises

**Factor each expression.**

10.  $s^2 + 2s - 35$

11.  $t^2 - 4t - 32$

12.  $u^2 + 6u - 27$

13.  $v^2 - 2v + 48$

14.  $w^2 - 8w - 9$

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