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. $x^2 + 9x + 20$

  $(x + 5)(x + 4)$

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

  $(y + 7)(y + 5)$

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

  $(z + 5)(z + 3)$

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

  $(a + 4)(a + 7)$

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

  $(b + 8)(b + 2)$

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

  $(c + 9)(c + 3)$

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

  $(d + 5)(d + 1)$

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

  $(e + 9)(e + 6)$

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

  $(f + 8)(f + 3)$

8-5 **Reteaching** (continued)

Factoring $x^2 + bx + c$

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. $s^2 + 2s - 35$

$(s + 7)(s - 5)$

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

$(t - 8)(t + 4)$

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

$(u + 9)(u - 3)$

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

$(v - 8)(v + 6)$

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

$(w - 9)(w + 1)$

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

$(x + 6)(x - 3)$