Lesson 27

Foundations of College Algebra

Recognize Perfect Square Trinomials

Perfect Square Trinomial Pattern

$$a^2 + 2ab + b^2 = (a+b)^2 \quad \text{and} \quad a^2 - 2ab + b^2 = (a-b)^2 .$$

Examples

Determine whether the following trinomials are perfect squares.

1. $25v^2 + 10v + 4$
2. $49x^2 - 28xy + 4y^2$

Your Turn

Determine whether the following trinomials are perfect squares.

1. $16y^2 + 24y + 9$
2. $100x^2 - 40x + 1$

Factor Perfect Square Trinomials

Examples

Factor completely.

1. $36s^2 + 84s + 49$
2. $25r^2 - 60rs + 36s^2$
3. $75u^3 - 30u^2v + 3uv^2$

Your Turn

Factor completely.

1. $49s^2 + 154s + 121$
2. $64z^2 - 16z + 1$
3. $10k^2 + 80k + 160$
4. $64x^2 - 96x + 36$

Factor the Difference of Two Squares

Difference of Squares Pattern

$$a^2 - b^2 = (a + b)(a - b)$$

Examples

Factor each binomial completely.

1. $x^2 - 16$
2. $49x^2 - 81y^2$
3. $98r^3 - 72r$

You Try

Factor each binomial completely.

1. $n^2 - 9$
2. $25v^2 - 1$
3. $36p^2 - 49q^2$
4. $5q^2 - 45$

Solve Quadratic Equations by Factoring

The Zero Product Property

If $a \cdot b = 0$, then either $a = 0$, $b = 0$, or both.

Examples

Solve the equations.

1. $(x + 1)(x - 4) = 0$
2. $(5n - 2)(6n - 1) = 0$

You Try

Solve the equations.

1. $(x - 3)(x + 7) = 0$
2. $(3a - 10)(2a - 7) = 0$

Definition

The standard form of a quadratic equation is $ax^2 + bx + c = 0$. Here, a, b, and c are constants.

Procedure

To solve a quadratic equation by factoring:

Step 1. Write the quadratic equation in standard form.
Step 2. Factor the quadratic expression.
Step 3. Use the Zero Product Property to write two linear equations.
Step 4. Solve the linear equations.
Step 5: Check.

Examples

Solve the equations.

1. $y^2 - 8y + 15 = 0$
2. $2y^2 = 13y + 45$
3. $144q^2 = 25$
4. $(3x - 8)(x - 1) = 3x$

You Try

Solve the equations.

1. $x^2 + 7x + 12 = 0$
2. $n^2 = 5n - 6$
3. $4b^2 + 7b = -3$
4. $4m^2 = 17m - 15$
5. $49m^2 = 144$
6. $(y - 3)(y + 2) = 4y$