

Vocabulary -

Leading Coefficient (LC) - the coefficient of the term in a polynomial with the largest degree. In a quadratic, the coefficient of the x^2 term.

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Factoring Quadratics

MGSE9-12.A.REI.4 Solve quadratic equations in one variable.

MGSE9-12.A.REI.4b Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, factoring, completing the square, and the quadratic formula, as appropriate to the initial form of the equation (limit to real number solutions). Build a function that models a relationship between two quantities.

What am I learning today?

How to break a quadratic down into its factors

How will I show that I learned it?

Factor a quadratic using special product rules

Factoring Quadratics

- LOTS of different patterns and methods
- You are "undoing" multiplication
- You can ALWAYS check your work by multiplying.

How did we distribute opposite binomials?

$$1. (x + 2)(x - 2) = x(x - 2) + 2(x - 2)$$

$$x^2 - \cancel{2x} + \cancel{2x} - 4$$

$$x^2 - 4$$

$$2. (4x - 1)(4x + 1) = 4x(4x + 1) - 1(4x + 1)$$

$$16x^2 + \cancel{4x} - \cancel{4x} - 1$$

$$16x^2 - 1$$

$$3. (3x + 4)(3x - 4) = 9x^2 - 16$$

$$4. (3x^2 + 4)(3x^2 - 4) = 9x^4 - 16$$

What pattern do we notice?

2 terms, Subtraction, Perfect Squares
Difference

Difference of two Squares

D.O.T.S.

What does DOTS stand for?

Factoring Special Products

S.F.

1. Put in order and check for a GCF (including a negative).
2. Check for DOTS. *2 terms*
3. If DOTS, take a square root of each term and label a and b.
4. Put in the format $(a + b)(a - b)$.

Example: $\sqrt{49x^2} - \sqrt{100} =$

$$(7x + 10)(7x - 10)$$

Special Patterns

Difference of two squares (**DOTS**):

$$a^2 - b^2 \longrightarrow \text{factors to: } (a + b)(a - b)$$

Examples:

1. $x^2 - 16$

$$= (x+4)(x-4)$$

2. $16x^2 - 25$

$$= (4x+5)(4x-5)$$

Special Patterns

Difference of two squares (**DOTS**):

$$a^2 - b^2 \longrightarrow \text{factors to: } (a + b)(a - b)$$

Examples:

3. $4x^2 - 9 =$

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

4. $x^2 + 36$

prime

****Note: this pattern does NOT work for sums!**

Special Patterns

Difference of two squares (**DOTS**):

$$a^2 - b^2 \longrightarrow \text{factors to: } (a + b)(a - b)$$

Factor completely.

Examples:

5. $81x^2 - 9$

$$9(\underline{9x^2 - 1})$$

$$9(3x+1)(3x-1)$$

6. $3x^2 - 9$

$$3(\underline{x^2 - 3})$$

**Note: this pattern does NOT work for sums!



