Pre-Algebra

Aim: How do we factor a polynomial that is a difference of two squares (DOTS)?

Do Now: Multiply each pair of binomials.

a) $(x-2)(x+2)$ x^2-4

b) $(x-5)(x+5)$ x^2-25

c) $(x+4)(x-4)$ x^2-16

Factoring the Difference of Two Squares ("DOTS")

1) In order to factor DOTS, you must recognize **DOTS.**

$x^2 - 9$ is a difference of two squares (DOTS)

Both x^2 and 9 are perfect squares. Since both squares are being subtracted, this expression is known as a **difference of two squares** (DOTS).

Remember:

An algebraic term is a perfect square when the numerical coefficient (the number in front of the variable) is a perfect square and the exponent of the variable(s) is an even exponent.

2) Once you recognize DOTS, you can factor **DOTS.**

Factor $x^2 - 9$ by taking the square root of each perfect square.

What is the square root of x^2? x

What is the square root of 9? 3

Let's list the perfect squares...

1, 4, 9, 16, 25, 36, 49, 64, 81, 100...

3) Using each root, create a sum and difference.

The factors are $x-3$ and $x+3$.

Therefore, $x^2 - 9$ written in **factored form** is $(x-3)(x+3)$.

Factor:

1) $x^2 - 100$

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

2) $x^2 - 81$

$(x-9)(x+9)$

3) $49 - x^2$

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

4) $x^2 - y^2$

$(x-y)(x+y)$

5) $16x^2 - 25$

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

6) $25x^2 - 36y^2$

$(5x-6y)(5x+6y)$

7) $81x^2 - 100w^2$

$(9x+10w)(9x-10w)$

* 8) $4x^2 - 16$

$4(x^2-4)$

$4(x-2)(x+2)$

9) $x^4 - 144$

$(x^2-12)(x^2+12)$

10) Is $x^2 + 4$ factorable? Explain.

No - not a difference of two squares

11) Is $x^9 - 4$ factorable? Explain.

No - the exponent is odd

With your group, determine if the polynomials are factorable or not. If the polynomial is factorable, factor it.

Partner Activity: Factor the polynomial if factorable.

1) $x^2 - 36$ $(x-6)(x+6)$

2) $4x^2 - 25$ $(2x-5)(2x+5)$

3) $x^2 + 1$ X

4) $x^2 - 2$ X

5) $64x^2 - y^4$ $(8x-y^2)(8x+y^2)$

6) $16x - 9y^2$ X

7) $100x^2 + 49$ X

8) $x^6 - y^{10}$ $(x^3-y^5)(x^3+y^5)$