Essential Question: How do we factor a binomial that is a difference of two squares?

Do Now: Multiply each pair of binomials.

a) $(x - 2)(x + 2)$ b) $(x - 5)(x + 5)$ c) $(x + 7)(x - 7)$

Factoring the Difference of Two Squares ("DOTS")

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

$\mathbf{x^2 - 9}$ is a difference of two squares (DOTS)

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

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

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

What is the square root of $\mathbf{x^2}$? __________

What is the square root of **9** ? __________

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

The factors are ___________ and ____________.

Therefore, $\mathbf{x^2 - 9}$ written in **factored form** is ______________________________.

Let's list the perfect squares…

Rule: $a^2 - b^2$ = ________________________

Factor:

1) $x^2 - 100$ 2) $x^2 - 81$ 3) $x^2 - 4$

4) $x^2 - y^2$ 5) $16x^2 - 25$ 6) $49x^2 - 36y^2$

7) $100x^4 - 1$

8) $144 - x^4$

9) $81x^2 - y^4$

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

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

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

*"**To be, or not to be: that is the question**" is the opening phrase in* *William Shakespeare's play Hamlet. It is perhaps the most famous of all literary quotations.*

"Factorable or not Factorable: that is the question"

Determine if the polynomials are factorable or not. If the polynomial is factorable, factor it.

1) $x - 36$__________________________

2) $4x^2 - 25$ __________________________

3) $x^2 + 1$__________________________

4) $x^2 - 2$__________________________

5) $64x^2 - y^4$__________________________

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

7) $100x^2 + 49$__________________________

8) $x^6 - 1$__________________________

Factor each polynomial by factoring out the GCF.

1. $24x + 6$
2. $10x^2 - 15x$
3. $3x^2 - 9$
4. $4x^3 + 8x^2 - x$
5. $2x^4 + 14x^3 - 60x^2$
6. $3x^2 + 21x + 48$

Factor into the product of two binomials.

7. $a^2 + 3a + 2$
8. $x^2 - 11x + 10$
9. $y^2 - 6y + 8$
10. $y^2 - 9y + 8$
11. $y^2 + 9y + 8$
12. $y^2 - 2y - 8$
13. $y^2 + 2y - 8$
14. $a^2 - 7a - 8$
15. $y^{2`} + 7y - 8$
16. $x^4 + x^2 - 30$
17. $x^4 - 16x^2 - 36$
18. $z^6 + 17z^3 + 42$

Factor into the product of two binomials.

19. $x^2 - 81$
20. $4x^2 - 9$
21. $64 - 100y^2$
22. $m^2 - 36$
23. $121a^2 - 1$
24. $169p^2 - 225$