

Difference of Squares

Objective: Identify and Factor Special Polynomials; Difference of Squares.

Difference of Squares: $(a^2 - b^2)$ where a^2 and b^2 are perfect squares and are always separated by a subtraction sign.

Difference of Squares

WARM-UP

Directions: Simplify the following polynomials.

- $(x + 4)(x - 4) = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$
- $(5m + 1)(5m - 1) = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$
- $(2a + 3b)(2a - 3b) = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

This resulting product is called
a **DIFFERENCE OF SQUARES**.



Steps to Factor a DIFFERENCE OF SQUARES

- 1 First, make sure you have an actual difference of squares!
(Must be a subtraction sign and you can square root both terms)
- 2 Use the following rule to factor: $a^2 - b^2 = (a+b)(a-b)$
- 3 Check your work by distributing!

2 TERMS
MINUS SIGN
PERFECT SQUARES
EVEN EXPONENTS!

EXAMPLES

Directions: Factor each difference of squares. Check your work by distributing. If a polynomial cannot be factored, write "prime."

1. $a^2 - 4$

$$(a+2)(a-2)$$

2. $n^2 - 64$

$$(n+8)(n-8)$$

3. $81 - x^2$

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

4. $c^2 - 100$

$$(c+10)(c-10)$$

5. $k^2 + 25$

prime

6. $1 - 49y^2$

$$(1+7y)(1-7y)$$

7. $9b^2 - 100$

$$(3b+10)(3b-10)$$

8. $25x^2 - 49$

$$(5x+7)(5x-7)$$

9. $16a^2 - 121$

$$(4a+11)(4a-11)$$

10. $x^2 - 81y^2$

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

11. $4h^2 - 25g^2$

12. $64u^2 - v^2$

Sometimes you have to take out the GCF first including variables in order to have a Difference of Squares.

Example:

$$48a^3 - 12a$$

GCF =

When you write your final answer the GCF goes outside your two ()

EXAMPLES
WITH A GCF

Directions: Look for a GCF first, then factor the remaining difference of squares. Check your work by distributing.

21. $\frac{2n^2 - 72}{2}$ $\frac{2}{2}$ $2(n^2 - 36)$ 22. $\frac{18x^2 - 50}{2}$ $\frac{2}{2}$ $2(9x^2 - 25)$

$2(n+6)(n-6)$ $2(3x+5)(3x-5)$

23. $\frac{32s^2 - 18t^2}{2}$ $\frac{2}{2}$ $2(16s^2 - 9t^2)$ 24. $\frac{45q^3 - 20q}{5q}$ $\frac{5q}{5q}$ $5q(9q^2 - 4)$

$2(4s+3t)(4s-3t)$ $5q(3q+2)(3q-2)$

25. $24a^2 - 54b^2$

26. $100b^3 - 36b$

27. $\frac{80n^4 - 125n^2}{5n^2}$ $\frac{5n^2}{5n^2}$
 $5n^2(16n^2 - 25)$

28. $8x^2y - 32y^3$

$5n^2(4n+5)(4n-5)$