

#4 $3q^2 - 7q + 2$

$a=3$ $b=-7$ $c=2$

$ac=6$

~~$\begin{array}{cc} -1 & 6 \\ -7 & -6 \end{array}$~~

$\left(\frac{3q^2}{q^2} - \frac{q}{q^2}\right) \left(\frac{-6q}{-2^2} + \frac{2}{-2^2}\right)$

$q(3q-1) - 2(3q-1)$

$(q-2)(3q-1)$

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

<p>WARM-UP</p> $(x+4)(x-4)$ <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">x^2</td> <td style="padding: 5px;">$4x$</td> </tr> <tr> <td style="padding: 5px;">$-4x$</td> <td style="padding: 5px;">-16</td> </tr> </table>	x^2	$4x$	$-4x$	-16	<p>Directions: Simplify the following polynomials.</p> <ul style="list-style-type: none"> $(x+4)(x-4) = \underline{\hspace{2cm}} = x^2 - 16$ $(5m+1)(5m-1) = \underline{25m^2 - 5m + 5m - 1} = 25m^2 - 1$ $(2a+3b)(2a-3b) = \underline{4a^2 - 6ab + 6ab - 9b^2} = 4a^2 - 9b^2$ <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-top: 10px;"> This resulting product is called a DIFFERENCE OF SQUARES. </div>
x^2	$4x$				
$-4x$	-16				

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

- 1.) A "minus" sign
- 2.) Two terms
- 3.) Perfect squares + even exponents

	$a + b$	
a	a^2	ab
$-b$	$-ab$	$-b^2$

$a^2 - b^2 \checkmark$

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

$$(2h+5g)(2h-5g)$$

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

$$(8u+v)(8u-v)$$

#17 $k^6 - 16$

$$(k^3+4)(k^3-4)$$

#18 $4p^4 - 25$

$$(2p^2+5)(2p^2-5)$$

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

Example:

$$\frac{48a^3}{12a} - \frac{12a}{12a}$$

$$\text{GCF} = 12a$$

$$12a(4a^2 - 1)$$
$$12a(2a+1)(2a-1)$$

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. $\frac{2n^2 - 72}{2 \quad 2} \quad 2(n^2 - 36)$
 $2(n+6)(n-6)$

22. $18x^2 - 50$

23. $\frac{32s^2 - 18u^2}{2 \quad 2} \quad 2(16s^2 - 9u^2)$
 $2(4s+3u)(4s-3u)$

24. $45q^3 - 20q$

25. $\frac{24a^2 - 54b^2}{6 \quad 6} \quad 6(4a^2 - 9b^2)$
 $6(2a+3b)(2a-3b)$

26. $100b^3 - 36b$

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

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

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

Entrance Ticket

#1 $\frac{2x^2 - 8}{2} \frac{8}{2} \rightarrow \text{GCF}$
 $2(x^2 - 4) \rightarrow \text{DOS}$

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

#2 $\frac{4x^2 - 4x - 24}{4} \frac{4x - 24}{4} \frac{24}{4} \rightarrow \text{GCF}$

$4(x^2 - x - 6) \rightarrow \text{AC}$
 $a=1 \quad b=-1 \quad c=-6$

~~$\begin{array}{r} -6 \\ 2 \quad -3 \\ -1 \end{array}$~~

$4(x+2)(x-3)$