

Factoring out the Greatest Common Factor (GCF)

To find the GCF among numbers, determine the biggest number that goes into all the numbers.

To find the GCF among variable terms, look to make sure that the same variable is in all terms, then choose the smallest exponent. Do this for each variable.

Once you have the GCF of all the terms, write it outside of an open parenthesis. It should look like:

GCF(

Inside the parenthesis should be what you multiply the GCF by in order to get the original polynomial.

Example 1: $8x + 12y$

The biggest number that goes into both 8 and 12 is 4

There are no common variables.

The GCF is 4, so 4 goes outside of the parenthesis.

4(

Now, what times 4 gives me $8x$? $2x$. That goes in the parenthesis

$4(2x$

Now, what times 4 gives me $+ 12y$? $+ 3y$. That goes next in the parenthesis.

$4(2x + 3y)$

I will check my answer using the distributive property.

Example 2: $14x^5 + 42x^4 - 28x^3$

The biggest number that goes into 14, 42 and 28 is 7

There is an x in each term. The lowest exponent is 4.

Therefore my GCF is $7x^4$. So, I will put $7x^4$ outside the parenthesis.

$7x^4($

Now what times $7x^4$ gives me $14x^5$? $2x$. Put that into the parenthesis.

$7x^4(2x$

Now what times $7x^4$ gives me $+ 42x^4 + 6$. Put that into the parenthesis.

$7x^4(2x + 6$

Now what times $7x^4$ gives me $- 28x^3 - 4x^4$. Put that into the parenthesis.

$7x^4(2x + 6 - 4x^4)$

I will check my answer using the distributive property.

Example 3: $10x^3y - 15xy^6 + 3y^{10}$

The biggest number that goes into 10, 15 and 3 is 1.

There is not an x in every term.

There is a y in every term. The lowest exponent is 1.

Therefore my GCF is $1y^1$. This should be written as y.

$y($

Now, what times y gives me $10x^3y$? $10x^3$. Put that into the parenthesis.

$y(10x^3$

Now, what times y gives me $- 15xy^6 - 15xy^5$. Put that into the parenthesis.

$y(10x^3 - 15xy^5$

Now, what times y gives me $+ 3y^{10} + 3y^9$. Put that into the parenthesis.

$y(10x^3 - 15xy^5 + 3y^9)$

I will check my answer using the distributive property.