

Notes on Factoring by Greatest Common Factor

Name _____

Perhaps, the process of factoring by removing the greatest common factor can be best stated as the **reverse distributive property**. In the distributive property, one is multiplying a certain factor to all of the terms. In factoring by GCF, one is dividing all of the terms by the GCF.

Consider this expression which utilizes the distributive property: $5x^2(4x^4 + 3)$.

After simplifying using the distributive property, you get $20x^6 + 15x^2$.

This section will now demonstrate how to factor by removing the GCF.

Let's now take your answer to the problem above: $20x^6 + 15x^2$.

Using what was learned in the last lesson, what is the GCF of the two terms ($20x^6$ and $15x^2$)?

Again, remember that this process is like the reverse distributive property.

So, let's now write the GCF in front of parentheses and divide (instead of multiplying) each of terms by it.

$$20x^6 + 15x^2$$
$$= \text{_____} (\quad \quad \quad)$$

As it turns out, this process yields the original question in the problem above.

Factor the greatest common factor: $8y^5 - 12y^3 + 4y$.

The GCF is $4y$, so it will be placed in front of the parentheses, and all of the terms in the expression will be divided by $4y$.

$$8y^5 - 12y^3 + 4y$$
$$= 4y(2y^4 - 3y^2 + 1)$$

Generating the last term in this expression is where many students make a mistake. In order to get "+1", one has to divide $4y$ by $4y$. Some students would think this is zero, and they would not write anything. However, it's important to see that $4y \div 4y = \boxed{1}$.

Factor the greatest common factor: $14z^8 + 24z^7 - 30z^3$.

First, find the GCF.

Now, place it in front of parentheses and divide each of the terms by it.