Algebra 2

Unit 1 Lesson 2: Greatest Common Factors

- Define the Greatest Common Factor
- Identify the GCF of polynomial expressions
- Factor out the GCF from an expression

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Warm Up: What is the <u>biggest</u> number that goes into all of the following numbers?   4

24   36   52

$\overset{4\ 6}{}$

1 2 3 8 12 24

1 2 3 4 $\overset{6}{}$ 9 12 18 36

1 2 4   13 26 52

Loose Definitions:

Factors: Any integer that can be multiplied by another integer to get a desired number. Oftentimes in pairs.

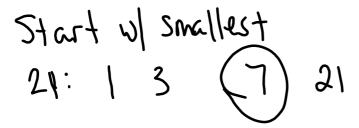Example: List all of the factor pairs of 24.

1,24   2,12   3,8   4,6

Ex 2: List all of the factors of 32 and 48.

1,32   2,16   4,8

1,48   2,24   3,16   4,12   6,8

Greatest Common Factor: When given a list of terms or numbers, the GCF is the largest factor that goes into each of the terms or numbers.

Look at the example above, which is the largest factor that appears on both lists? That would be the GCF.

Ex 3: Given the numbers 21, 28, and 63, what is the Greatest Common Factor?

Start w/ smallest

21: 1 3 (7) 21

Variables and Exponents in GCFs:

if the same variable is in every term, it is also considered to be part of the Greatest Common Factor. If the variables are all being raised to various exponents, look to see what the smallest exponent is.

Ex 4: State the GCF of the terms in the expression...

$$4x^3 + 2x^2 - 6x^5 - 12x^4$$

$2x^2$

<u>Try it yourself.</u>

Ex 5: Identify the GCF of the following expression.

$$6x^5 - 15x + 12x^3 - 21x^2$$

6: 1 2 ③ 🚫

GCF: 3x

"Factoring out" the GCF.

When you "Factor Out" something, you basically divide every term by the thing you "factored out", and leave what is left inside parentheses.

Looking at a previous example, factor out the GCF.

$$\frac{4x^3}{2x^2} + \frac{2x^2}{2x^2} - \frac{6x^5}{2x^2} - \frac{12x^4}{2x^2}$$

$$GCF: 2x^2$$

$$2x^2\left(2x + 1 - 3x^3 - 6x^2\right)$$

Factor out the GCF of the following expression.

$$\frac{6x^5 - 15x + 12x^3 - 21x^2}{3x \quad 3x \quad 3x \quad 3x}$$

$$3x\left(2x^4 - 5 + 4x^2 - 7x\right)$$

<u>Try it yourself.</u>

Factor out the GCF of the following expression.

$$-16x^4 - 8x^{10} + 40x^3 + 32x^5$$

$$8x^3\left(-2x - 1x^7 + 5 + 4x^2\right)$$

Homework: GCF Factoring worksheet