

Warm-Up 2/26/2021

1. What is the greatest common factor of 12, 16, 8, and 24? $\Rightarrow 4$

2. What is the GCF of $4x$, x^2 , and $12x$? $= x$

3. What is the GCF of $4x^2y$, and $8xy^2$? $4xy$

12	16	8	24
$\begin{array}{c c} 1 & 12 \\ 2 & 6 \\ 3 & 4 \\ \hline & \end{array}$	$\begin{array}{c c} 1 & 16 \\ 2 & 8 \\ 4 & 4 \\ \hline & \end{array}$	$\begin{array}{c c} 1 & 8 \\ 2 & 4 \\ \hline & \end{array}$	$\begin{array}{c c} 1 & 24 \\ 2 & 12 \\ 3 & 8 \\ 4 & 6 \\ \hline & \end{array}$

$GCF = 4$

$4x$	x^2	$12x$
$\begin{array}{c c} 1 & 4 \\ 2 & 2 \\ \hline & \end{array}$	$\begin{array}{c c} 1 & 1 \\ \hline & \end{array}$	$\begin{array}{c c} 1 & 12 \\ 3 & 4 \\ \hline & \end{array}$

$4x^2y$	$8xy^2$
$\begin{array}{c c} 1 & 4 \\ 2 & 2 \\ \hline & \end{array}$	$\begin{array}{c c} 1 & 8 \\ 2 & 4 \\ \hline & \end{array}$

After completion of this unit, you will be able to...

Learning Target #1: Factoring

- Factor the GCF out of a polynomial
- Factor a polynomial when $a = 1$
- Factor a polynomial when $a \neq 1$
- Factor special products (difference of two squares)

Learning Target #2: Solving by Factoring Methods

- Solve a quadratic equation by factoring a GCF.
- Solve a quadratic equation by factoring when a is not 1.
- Create a quadratic equation given a graph or the zeros of a function.

Learning Target #3: Solving by Non Factoring Methods

- Solve a quadratic equation by finding square roots.
- Solve a quadratic equation by completing the square.
- Solve a quadratic equation by using the Quadratic Formula.

Learning Target #4: Solving Quadratic Equations

- Solve a quadratic equation by analyzing the equation and determining the best method for solving.
- Solve quadratic applications

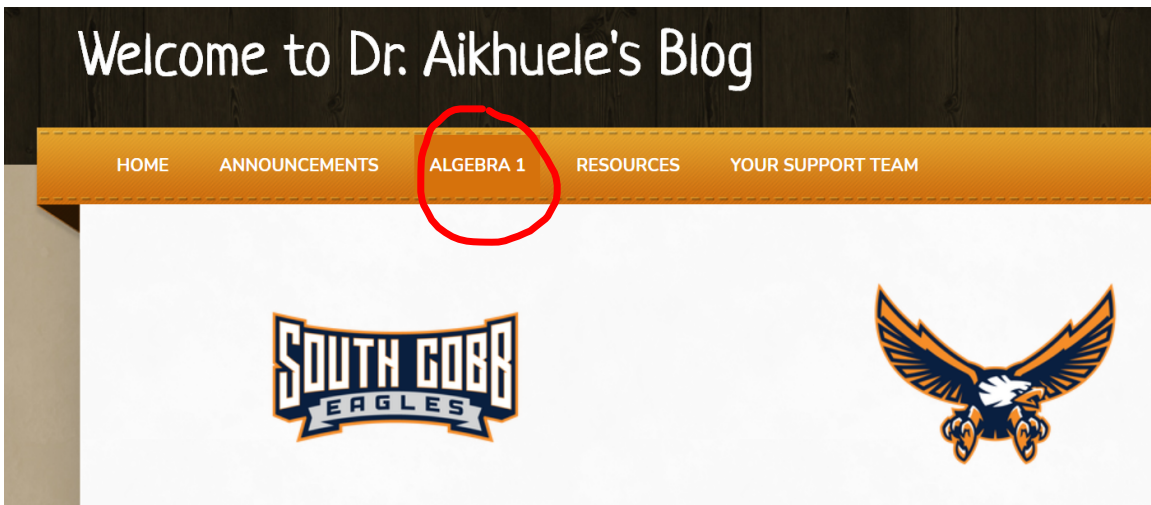
Solving by Factoring Quadratic Equations

Type of Factoring	What Should I Notice?	Examples
GCF (Day 1)	Two Terms Only "A & B" terms (ex. $x^2 + 4x$) No "C" Term	$x^2 - 5x = 0$ $3x^2 + 6x = 0$
A = 1 (Day 2)	Three Terms Two Terms (No "B" Term) Integer Zeros (ex. $x = 3$ & -4)	$x^2 + 4x - 32 = 0$ $x^2 - 49 = 0$

A not 1 (Day 3)	Three Terms The “a” term has a coefficient in front of x^2 (ex. $3x^2$) Fractional Zeros (ex. $x = \frac{1}{2}$ and -3)	$3x^2 - 13x - 10 = 0$
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Remember to always have your equations set equal to 0!

Unit 3A Time Line



Algebra 1 Spring Semester 2021

Unit 1: Relationships Between Quantities & Expressions

January 7th - 28th

Unit 2A - Reasoning with Linear Equations & Inequalities

January 29th - February 25th

Winter Break: February 15th - 19th

Unit 3A - Solving Quadratic Equations

February 26th - March 15th

Essential Question 2/26/2021

- How do you factor quadratic polynomials using the GCF method?



Learning Target

Factor quadratic polynomials using GCF.

What is Factoring 2/26/2021

Standard(s):

MGSE9–12.A.SSE.3a Factor any quadratic expression to reveal the zeros of the function defined by the expression.

What is Factoring?

Factoring

- Finding out which two expressions you multiply together to get one single expression.
- “Splitting” an expression into a product of simpler expressions.
- The opposite of expanding or distributing.



Numbers have factors:

$$\begin{array}{c} \text{Factor} \nearrow 2 \times 3 = 6 \nwarrow \text{Factor} \end{array}$$

Expressions have factors too:

$$\begin{array}{c} \text{Factor} \quad \text{Factor} \\ \text{---} \quad \text{---} \\ (x+3)(x+1) = x^2 + 4x + 3 \end{array}$$

Review: Finding the GCF of Two Numbers

Common Factors

- Factors that are shared by two or more numbers

Greatest Common Factor (GCF)

- To find the GCF create a factor t-chart for each number and find the largest common factor

Example: Find the GCF of 56 and 104

56	
1	56
2	28
4	14
7	8

104	
1	104
2	52
4	26
8	13

So, the GCF of 56 and 104 is 8.

Examples

Find the GCF of the following numbers.

a. $30, 45 = 15$

b. $12, 54 = 6$

30	
1	30
2	15
3	10
5	6
45	
1	45
3	15
5	9

12	
1	12
2	6
3	4
54	
1	54
2	27
3	18
6	9

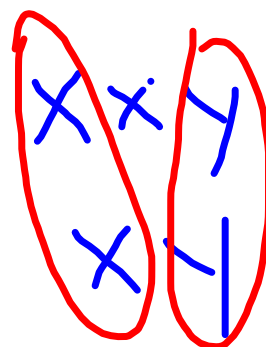
Find the GCF of Two Expressions

To find the GCF of two expressions, create a factor chart for the two numbers AND expand the variables. Circle what is common to both.

Example: Find the GCF of $36x^2y$ and $16xy$

36	
-1	36
-2	18
3	12
4	9
6	6

16	
-1	16
-2	8
4	4

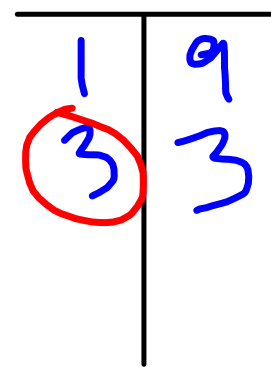
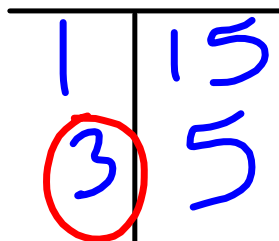
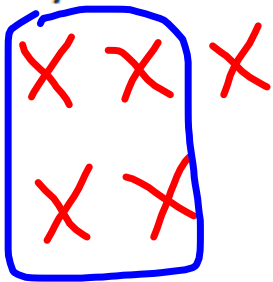


GCF = 4xy

Examples

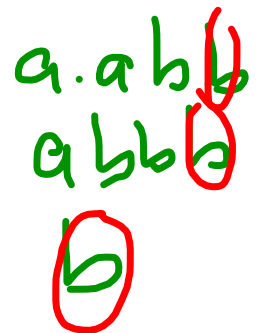
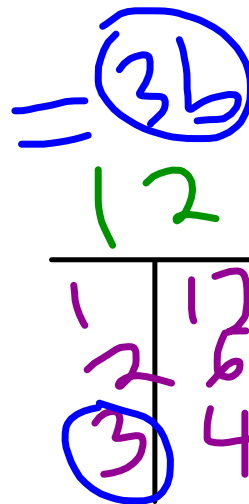
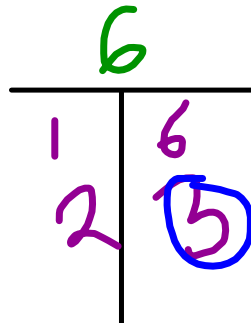
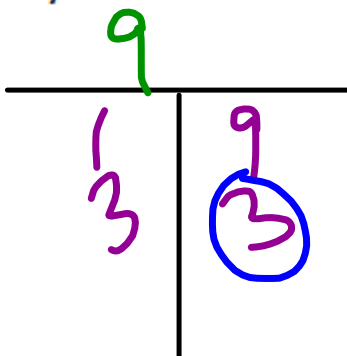
Find the GCF of the following pairs of expressions:

1) $15x^3$ and $9x^2$



GCF = $3x^2$

2) $9a^2b^2$, $6ab^3$, and $12b$



Practice - You do

3) $8x^2$ and $7y^3$

8	
1	8
2	4

7	
1	7

$$GCF = 1$$

Factoring by GCF

Steps for Factoring by GCF

1. Find the greatest common factor of all the terms.
2. The GCF of the terms goes on the outside of the expression and what is leftover goes in parenthesis after the GCF.
3. After "factoring out" the GCF, the only number that divides into each term should be 1.

Practice: Factor each expression.

1) $x^2 + 5x$ GCF = x
 $x(x+5)$

2) $x^2 - 8x$ GCF = x
 $x(x-8)$

3) $28x - 63$ GCF = 7
 $7(4x-9)$

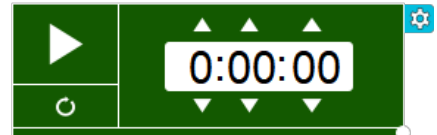
4) $18x^2 - 6x$ GCF = $6x$
 $6x(3x-1)$

5) $-2m^2 - 8m$ GCF = $-2m$
 $-2m(m+4)$

6) $-9a^2 - a$ GCF = $-a$
 $-a(9a+1)$

~~$-2m \cdot m$~~
 $-2m$

Warm-Up 3/1/2021



Factoring by GCF

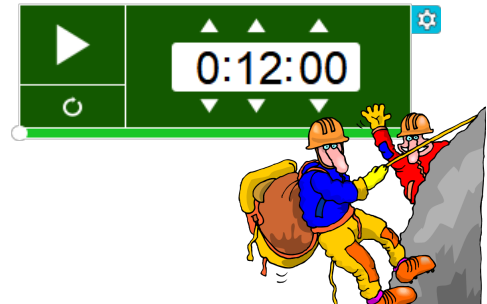
7) $\frac{6x^3 - 9x^2 + 12x}{3x}$ GCF = $3x$ $\frac{4x^3 + 6x^2 - 8x}{2x}$ GCF = $2x$ 9) $\frac{15x^3y^2 + 10x^2y^4}{5x^2y^2}$ GCF = $5x^2y^2$

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

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

$5x^2y^2(3x + 2y^2)$

Class Work



Day 1: Factoring by GCF

Day 1 – Factor GCF of a Quadratic Expression

Name: _____

Practice Assignment

Date: _____ Block: _____

Review: Multiply the polynomials

a. $(x + 4)(x - 3)$

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

$= x^2 + x - 12$

b. $(x + 8)^2 = (x+8)(x+8)$ $(2x + 4)(5x - 1)$

	x	$+8$
x	x^2	$8x$
$+8$	$8x$	64

$= x^2 + 16x + 64$

	$2x$	$+4$
$5x$	$10x^2$	$20x$
-1	$-2x$	-4

$= 10x^2 + 18x - 4$

Factor the following polynomials.

1. $x^2 + 10x$ x
 $x(x+10)$

2. $x^2 - 9x$
 $x(x-9)$

3. $x^2 - 6x$
 $x(x-6)$

4. $3b^2 - 81b$

$$3b(b-27)$$

5. $10x^2 + 40x$

$$10x(x+4)$$

6. $8x^2 + 24x$

$$8x(x+3)$$

10. $-2x^2 - 4x$

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

11. $-30x^2 + 25x$

$$-5x(6x+5)$$

12. $-28x^2 - 14x$

$$-14x(2x+1)$$

Quick Check

Factor the following Polynomial:

$$\frac{9x^4 + 3x^3 + 12x^2}{3x^2}$$

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

Attachments

Functions notation.ppt

Functions Practice HW.docx

Functions notation notes.ppt