Good morning!

1. "Here"

2. Begin Unit 2

3. Notes on Greatest Common Factor

4. Practice p. 7-8 to CTLS

Algebra 1

Unit 2 Part 1

Quadratic Functions

Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
			Feb. 11th	Feb. 12th
			Factoring by Greatest Common Factor	Factoring Quadratic Trinomials
Feb. 15th	Feb. 16th	Feb. 17th	Feb. 18th	Feb. 19th
Winter Break Work on Optional Bonus Assignment				
Feb. 22nd	Feb. 23rd	Feb. 24th	Feb. 25th	Feb. 26th
Factoring Quadratic Trinomials	Review **Test**	**Test due at midnight**	*Solving Quadratics by Factoring*	*Solving Quadratics by Factoring*

What is in common?

What is different?

all signs
Toronto and Vienna - red signs
all places
St. Catharine and Argentina have blue
all rays sharing same endpoint

diff. destinations

Most Same, shared multiply

Greatest Common Factor - Numbers

The **greatest common factor** is most often thought of as the largest factor of two numbers. In simpler terms, the greatest common factor is the largest number that divides evenly into two numbers.

To help find the greatest common factor, often a list of factors for the numbers is generated.

Example 1: Find the greatest common factor (GCF) of 12 and 20.

The factors of 12 are: 1, 2, 3, 4, 6, 12

The factors of 20 are: 1, 2, 4, 5, 10, 20

4 (3) = 12
4 (5) = 20

The factors they have in common are 1, 2, and 4. The largest of these factors is 4 making 4 our GCF of 12 and 20.

Example 2: Find the greatest common factor (GCF) of 30 and 45.

Factors of 30: 1, 2, 3, 5, 6, 10, 15, 30

Factors of 45: 1, 3, 5, 9, 15, 45

The greatest common factor of 30 and 45 is 15.

Practice: For each of the questions below, find the GCF of the two numbers listed.

1) 12 and 15 3
12: 1, 2, 3, 4, 6, 12
15: 1, 3, 5, 15

2) 18 and 60 $\boxed{6}$
18: 1, 2, 3, 6, 9, 18
60: 1, 2, 3, 4, 5, 6, 12, 15, 20, 30, 60

3) 4 and 24
4: 2 2
24: 12 2, 6 2, 3 2
$\boxed{2^2}$ → 4

4) 28 and 42 → 7 · 2 = $\boxed{14}$
28: 4 7, 2 2
42: 2 21, 3 7

5) 11 and 48 → $\boxed{1}$
Prime 11
48: 4 12, 2 2, 2 6, 2 3

6) 30 and 105 → $\boxed{15}$
30: $\boxed{3}$ 10, 2 $\boxed{5}$
105: $\boxed{5}$ 21, 7 $\boxed{3}$

$6 = 2 \cdot 3$

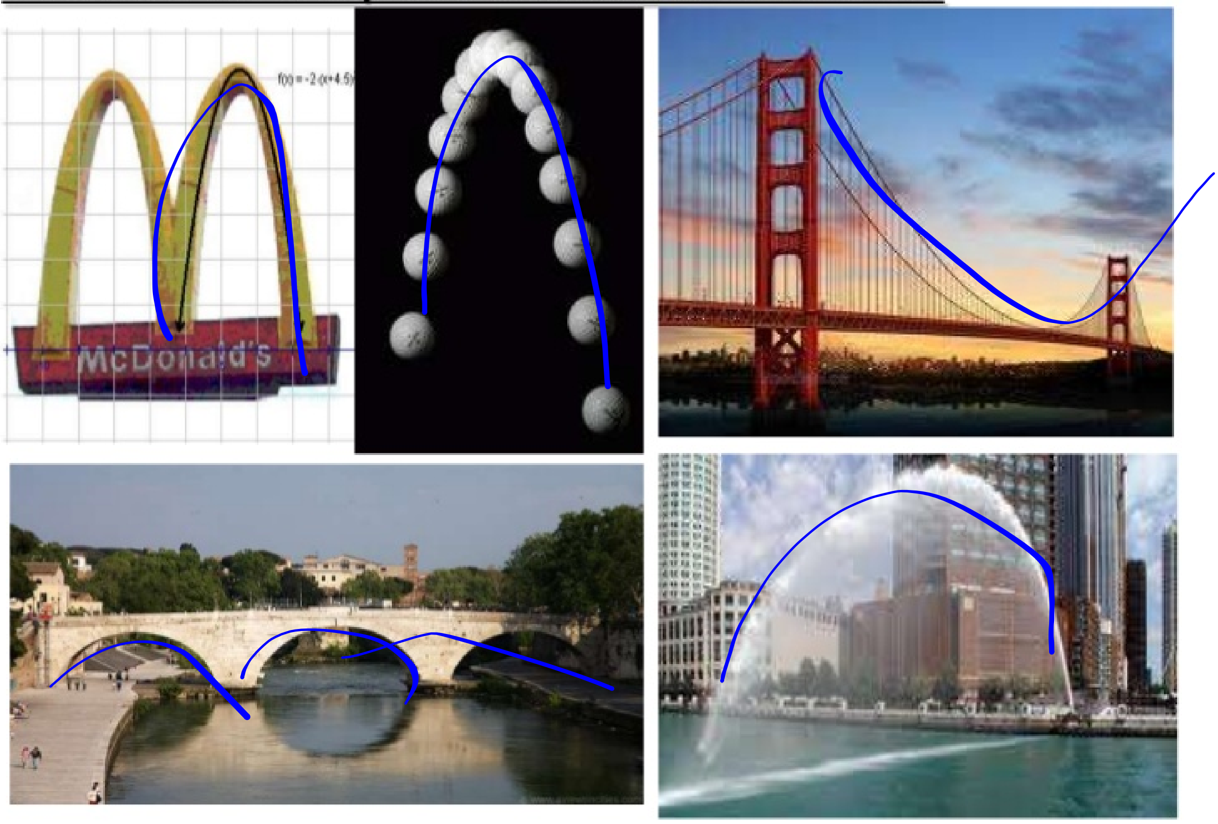
multiply / distribute

$6(x+2) = 6x+12$

"undistribute"

① Divide out common factor

Where do we see quadratic functions in real life?



Greatest Common Factor – Algebraic Terms

When finding the greatest common factor (GCF) of two or more algebraic terms, you must find the GCF of the coefficients as well as the GCF of the variables. Then multiply them together to get the GCF of the algebraic terms.

Example 1: Find the greatest common factor (GCF) of $10x$ and $4x$.

$10x: 2 \cdot 5 \cdot x$
$4x: 2 \cdot 2 \cdot x$

The factors of 10: $1, 2, 5, 10$ The factors of x: x

The factors of 4: $1, 2, 4$ The factors of x: x

The greatest common factor of $10x$ and $4x$: $2 \cdot x = 2x$.

GCF on variables: same letter, smallest exponent

Example 2: Find the greatest common factor (GCF) of $14x^2$ and $42x$.

$14x^2: 2 \cdot 7 \cdot x \cdot x$
$42x: 2 \cdot 3 \cdot 7 \cdot x$

The factors of 14: 1, 2, 7, 14 The factors of x^2: $x\, x$

The factors of 42: 1, 2, 3, 6, 7, 14, 21, 42 The factors of x: x

The greatest common factor of $14x^2$ and $42x$: $14 \cdot x = 14x$.

Practice: For each of the questions below, find the GCF of the algebraic terms listed.

1) $21x^2$ and $18x$ → $\boxed{3x}$

7 3 x x; 6 3 x; 3 2

2) $32xy$ and $5y$ → $\boxed{y}$

2 16 y; 8 2; 4 2; 2 2; 5 y

3) $14x^2$ and 12 → $\boxed{2}$

7 2 x x; 2 6; 3 2

4) $36x^2y^2$ and $8x$

5) $24x$ and $64y$

6) 16 and $100y^2$

$16y^2x^4$ $\qquad$ $21y^{17}x^3z^2$

16: 8, 2

8: 4, 2

4: 2, 2

21: 7, 3

y y

y y y y y y y y y y y y y y y y y

$\boxed{1y^2x^3}$

$\boxed{x^3y^2}$

Factoring – Greatest Common Factor

Remember, when multiplying, the terms being multiplied together are known as **factors** and the result of the multiplication is known as the **product**.

For example: in the problem, $3 \cdot 4 = 12$, 3 and 4 are the factors and 12 is the product. In reverse, we could say that 12 is factored into $3 \cdot 4$.

Think about the expression $4x(2x - 1)$. The factors in this expression are $4x$ and $2x - 1$. Their product can be found by using the distributive property, $8x^2 - 4x$. In reverse, we could say that $8x^2 - 4x$ is $4x \cdot (2x - 1)$ or $4x(2x - 1)$.

Factoring is using the distributive property in reverse. "undistributing"

For the following expressions, identify the factors and the products.

	Factors		Product
1) $2x(3x - 6) = 6x^2 - 12x$	$2x \cdot 3x$	$2x(-6)$	$6x^2 - 12x$
2) $-12x^2 + 10x = -2x(6x - 5)$	$-2(6x)$	$-2(-5)$	$-12x^2 + 10x$
3) $8(x^2 + 4) = 8x^2 + 32$	$8(x^2)$	$8(4)$	$8x^2 + 32$
4) $-6x(x + 7) = -6x^2 - 42x$	$-6x \cdot x$	$-6x \cdot 7$	$-6x^2 - 42x$

When given an expression that you are being asked to factor, begin by finding the ~~greatest common factor (GCF) of all~~ the terms – this will be your first factor. To find your second factor, divide each term of the original expression by the GCF.

Example 1: Factor $12x^2 + 22x$.

Steps: ①The GCF of $12x^2$ and $22x$ is $2x$. ② $\frac{12x^2}{2x} = 6x$ and $\frac{22x}{2x} = 11$

$12x^2 + 22x$ factored is $2x(6x + 11)$.

When factoring, if the leading coefficient of your expression is negative, include the negative in the greatest common factor.

Example 2: Factor $-21x^2 + 7x$.

Steps: ①The GCF of $-21x^2$ and $7x$ is $-7x$. ② $\frac{-21x^2}{-7x} = 3x$ and $\frac{7x}{-7x} = -1$

$-21x^2 + 7x$ factored is $-7x(3x - 1)$.

GCF $-7x(3x - 1)$ After divide

Practice: Factor each of the expressions below.

1) $-18x - 15$

$\frac{-18x}{-3} = 6x$ $\frac{-15}{-3} = 5$

$\boxed{-3(6x+5)}$

2) $16x + 24$

$4\left(\frac{4x}{2}+\frac{6}{2}\right)$

$4 \cdot 2(2x+3)$

$8(2x+3)$

$2^3 = 8$

$8(2x+3)$

3) $3y^2 + 6y$

$\boxed{3y(y+2)}$

4) $8x^2y^2 - 36y$

$\frac{-36y}{4y}$

$\boxed{4y(2x^2y - 9)}$

5) $-12x^2y + 20xy$

$\frac{-12x^2y}{-4xy} = 3x$

$\frac{20xy}{-4xy} = -5$

$-4xy(3x - 5)$

6) $7x - 8 = \boxed{7x - 8}$

PRIME

7) $18x^2 + 81x + 63$

$\boxed{9(2x^2 + 9x + 7)}$

8) $22x^2y^2 + 33xy^2 - 99xy$

$\boxed{11xy(2xy + 3y - 9)}$

Factoring by GCF Practice

Directions: For the following problems, factor by finding and factoring out the greatest common factor.

1) $4x - 14$

$\boxed{2(2x-7)}$

2) $-4x + 5$

$\boxed{-1(4x-5)}$

3) $20x^2 - 30y$

$\boxed{10(2x^2-3y)}$

4) $10xy - 7y^2$

$\boxed{y(10x-7y)}$

5) $6x^2y - 18xy$

$\boxed{6xy(x-3)}$

6) $x^2y^2 - 4x$

7) $18x^5 + 2x^4 + 2x^3$

8) $3r^5 + 5r^3 - 9r^2$

9) $20x^2 + 6x^2y^2 + 4xy^2$

10) $10x^4y^6 + 3x^4y^4 - x$

$\boxed{x(10x^3y^6+3x^3y^4-1)}$

11) $-25x^6 + 5x^4 - 40x^3$

12) $63x^2y^2 - 18x^2$

Where do Tadpoles in the Pawn Shop Come From?

Factor each polynomial below as the product of its greatest monomial factor and another polynomial. Find your answer and notice the letter next to it. Write this letter in each box that contains the number of that exercise.

1) $3x^2 + 18x + 9$
2) $2x^2 + 10x + 12$
3) $7x^2 + 14x + 35$
4) $5x^2 - 20x + 10$
5) $6x^2 + 9x - 21$
6) $n^3 + n^2 + n$
7) $n^4 - n^3 + n^2$
8) $2n^3 - n^2 - 5n$
9) $3n^2 + 9n$
10) $7n^2 - 28n$
11) $4k^3 - 32k$
12) $6k^3 + 10k^2$
13) $5k^3 + 15k^2 + 10k$
14) $4k^3 - 20k^2 + 4$
15) $4k^4 + 18k^3 - 6k^2$

Answers:

D) $3(2x^2 + 3x - 7)$
L) $3(2x^2 + 4x - 5)$
A) $3(x^2 + 6x + 3)$
P) $5(x^2 - 2x + 5)$
F) $5(x^2 - 4x + 2)$
O) $2(x^2 + 5x + 6)$
B) $7(x^2 + x + 6)$
E) $7(x^2 + 2x + 5)$

Answers:

S) $n(2n^2 - 2n - 6)$
O) $n^2(n^2 - n + 1)$
I) $7n(n + 5)$
F) $3n(n + 3)$
E) $n^2(n^2 - 2n + 3)$
A) $n(n^2 + n + 1)$
M) $n(2n^2 - n - 5)$
R) $7n(n - 4)$

Answers:

P) $4(k^3 - 5k^2 + 1)$
R) $5k(k^2 + 3k + 2)$
S) $4(k^3 - 8k^2 + 2)$
G) $4k(k^2 - 8)$
L) $5k(k^2 + 4k + 1)$
W) $2k^2(2k^2 + 9k - 3)$
T) $2k^2(3k - 9)$
N) $2k^2(3k + 5)$

4	10	2	8	1	9	13	7	11	14	6	15	12	3	5