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Algebra Factoring Polynomials 7C

Factoring expressions is one of the ***gateway skills*** that is necessary for much of what we do in algebra for the rest of the course. The word ***factor*** has two meanings and both are important.

THE TWO MEANINGS OF FACTOR

1. **Factor (verb):** To rewrite an algebraic expression as an **equivalent product**.
2. **Factor (noun):** An algebraic expression that is one part of a larger factored expression.

Factoring using GCF:

Take the greatest common factor (GCF) for the numerical coefficient. When choosing the GCF for the variables, if all the terms have a common variable, take the one with the lowest exponent.

ie) $9x^4 + 3x^3 + 12x^2$

GCF: coefficients: 3

Variable (x) : x^2

GCF: $3x^2$

What's left? Division of monomials:

$9x^4/3x^2$ $3x^3/3x^2$ $12x^2/3x^2$

$3x^2$ x 4

Factored Completely: $3x^2(3x^2 + x + 4)$

Factor each problem using the GCF and check by distributing:

1) $14x^9 - 7x^7 + 21x^5$

2) $26x^4y - 39x^3y^2 + 52x^2y^3 - 13xy^4$

3) $32x^6 - 12x^5 - 16x^4$

4) $16x^5y^2 - 8x^4y^3 + 24x^2y^4 - 32xy^5$

5) $24b^{11} + 4b^{10} - 6b^9 + 2b^8$

6) $96a^5b + 48a^3b^3 - 144ab^5$

7) $11x^3y^3 + 121x^2y^2 - 88xy$

8) $75x^5 + 15x^4 - 25x^3$

Exercise #1: Consider the expression $6x^2 + 15x$.

(a) Write the individual terms $6x^2$ and $15x$ as completely factored expressions. Determine their **greatest common factor.**

(b) Using the Distributive Property, rewrite $6x^2 + 15x$ as a product involving ***GCF*** from (a).

It is important that you are fluent reversing the distributive property in order to factor out a common factor (most often the greatest common factor). Let's get some practice in the next exercise just identifying the greatest common factors.

> The greatest common factor, or GCF, is the greatest factor that divides two numbers. To find the GCF of two numbers: List the prime factors of each number. Multiply those factors both numbers have in common. If there are no common prime factors, the GCF is 1.

$$24x^3 - 16x^2 + 8x = 8x\left(3x^2 - 2x + 1\right)$$

$$24x^3 \div 8x = 3x^2$$

$$-16x^2 \div 8x = -2x$$

$$8x \div 8x = 1$$

Exercise #2: For each of the following, identify the greatest common factor of each. Then factor each of the following. The first example is completed for you.

(a) $\dfrac{12x^3 + 18x}{6x}$ $\quad GCF = 6x$

$6x(2x^2 + 3)$

(b) $5x^4 - 25x^2$

(c) $6x^2 + 10x$

(d) $3x - 24$

(e) $10x^3 - 15x$

(f) $21x^2y^5 + 14xy^7$

(g) $24x^3 + 8x^2 - 16x$

(h) $20x^3 - 12x^2 + 28x$

(i) $4x^2 + 8x + 24$

(j) $6x^3 - 8x^2 + 2x$

(k) $10x^3 - 35x^2$

(l) $10x^2 - 40x - 50$

(m) $8x^3y^2 + 24x^2y^4 - 32xy^6$

(n) $18x^2y^2 + 45x^2y - 90xy$

Being able to fluently factor out a gcf is an essential skill. Sometimes greatest common factors are more complicated than simple monomials. We have done this type of factoring back in Unit #1.

Exercise #3: Rewrite each of the following expressions as the product of two binomials by factoring out a common binomial factor.

(a) $(x + 5)(x - 1) + (x + 5)(2x - 3)$

(b) $(2x - 1)(2x + 7) - (2x - 1)(x - 3)$

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Algebra Factoring Polynomials 7C HW

____ 1.) Which of the following is the greatest common factor of the terms $36x^2y^4$ and $24xy^7$?
[1] $12xy^4$ [3] $6x^2y^3$
[2] $24x^2y^7$ [4] $3xy$

2.) Write each of the following as equivalent products of the polynomial's greatest common factor with another polynomial (of the same number of terms). The first example is done for you.

(a) $\frac{8x-28}{4}$ GCF = 4 $4(2x-7)$

(b) $50x+30$

(c) $24x^2+32x$

(d) $18-12x$

(e) $6x^3+12x^2-3x$

(f) x^2-x

(g) $10x^2+35x-20$

(h) $21x^3-14x$

(i) $36x-8x^2$

(j) $30x^3-75x^2$

(k) $-16t^2+96t$

(l) $4t^3-32t^2+12t$

____ 3.) Which of the following is not a correct factorization of the binomial $10x^2+40x$?
[1] $10x(x+4)$ [3] $5x(2x+4)$
[2] $10(x^2+4x)$ [4] $5x(2x+8)$

4.) Rewrite each of the following expressions as a product of two binomials by factoring out a common factor. Watch out for the subtraction problems!!

(a) $(x+5)(x+1)+(x+8)(x+5)$

(b) $(2x-1)(3x+5)-(2x-1)(x+4)$

(c) $(x-7)(x-9)+(x-7)(4x+5)$

(d) $(x+1)(5x-7)-(x-3)(x+1)$

5.) The area of a rectangle is represented by the polynomial $16x^2+56x$. The width of the rectangle is given by the binomial $2x+7$.

(a) Given a monomial expression in terms of x for the length of the rectangle. Show how you arrived at your answer.

(b) If the length of the rectangle is 80, what is the width of the rectangle? Explain your thinking.

Review Section:

____ 6.) Which value of x is a solution of the inequality $25x-100<250$?

(1) 13
(2) 14
(3) 15
(4) 16

____ 7.) The set of integers in [6,10) can be written as

(1) {6, 7, 8, 9, 10}
(2) {7, 8, 9, 10}
(3) {6, 7, 8, 9}
(4) {7, 8, 9}

8.) The length of a rectangle is represented by x^2+3x+2, and the width is represented by $4x$. Express the perimeter of the rectangle as a trinomial.

Name _____ Date _____ Period _____

Algebra Factoring Polynomials 7C HW

Homework Answers

1.) 2

2.) b) $10(5x + 3)$

c) $8x(3x + 4)$

d) $6(3 - 2x)$

e) $3x(2x^2 + 4x - 1)$

f) $x(x - 1)$

g) $5(2x^2 + 7x - 4)$

h) $7x(3x^2 - 2)$

i) $4x(9 - 2x)$

j) $15x^2(2x - 5)$

k) $-16t(t - 6)$

l) $4t(t^2 - 8t + 3)$

3.) 3

4.) a) $(x + 5)(2x + 9)$

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

c) $(x - 7)(5x - 4)$

d) $(x + 1)(4x - 4)$

5.) a) Length = 8x

b) Width = 27

6.) 1

7.) 3

8.) Perimeter = $2x^2 + 14x + 4$

Name _____ Date _____ Period _____

Algebra Factoring Polynomials (Day 2) 7D

Recall: Factoring expressions is one of the ***gateway skills*** that is necessary for much of what we do in algebra for the rest of the course. The word ***factor*** has two meanings and both are important.

THE TWO MEANINGS OF FACTOR

1. **Factor (verb):** To rewrite an algebraic expression as an **equivalent product**.
2. **Factor (noun):** An algebraic expression that is one part of a larger factored expression.

Exercise #1: Consider the expression $4x(x+3) - 5(x+3)$.

(a) Identify the GCF of the expression.

(b) Factor the given expression into simplest form (the product of two binomials).

Exercise #2: Factor each of the following expression into simplest form (the product of two binomials).

(a) $9x(x+1) + 7(x+1)$

(b) $4x(x+6) + 9(x+6)$

(c) $8x(x+5) - 11(x+5)$

(d) $14x(x-12) + 9(x-12)$

(e) $3x(x+2) - 5(x+2)$

(f) $6x(x+7) + 5(x+7)$

(g) $12x(x-9) + 7(x-9)$

(h) $7x^2(x+12) - 5(x+12)$

(i) $8x^2(x+11) - 3(x+11)$

(j) $12x^2(x-4) + 11(x-4)$

Exercise #3: Factor each of the following expressions, by utilizing grouping, into simplest form (the product of two binomials).

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

(b) $5x^2 + 20x - 3x - 12$

(c) $7x^2 - 14x + x - 2$

(d) $11x^2 - 66x + 2x - 12$

(e) $2x^3 + 2x^2 - 7x - 7$

(f) $3x^2 - 15x + 4x - 20$

(g) $4x^2 + 36x + 5x + 45$

(h) $6x^3 - 12x^2 - 5x + 10$

(i) $8x^3 + 24x^2 - x - 3$

(j) $x^2 + 4x + 11x + 44$

Name _____ Date _____ Period _____

Algebra Factoring Polynomials (Day 2) 7D HW

1.) Factor each of the following expression into simplest form (the product of two binomials).

(a) $3x(x+1)-4(x+1)$

(b) $x^2(x+5)+2(x+5)$

(c) $5x(x+4)-3(x+4)$

(d) $7x(x-2)+1(x-2)$

(e) $11x(x-6)+2(x-6)$

(f) $2x^2(x+1)-7(x+1)$

(g) $9x^2(x+2)+7(x+2)$

(h) $3x(x-5)+4(x-5)$

(i) $8x^2(x-4)+11(x-4)$

(j) $12x(x+9)-5(x+9)$

2.) Factor each of the following expressions, by utilizing grouping, into simplest form (the product of two binomials).

(a) $3x^3+2x^2+15x+10$

(b) $4x^3-4x^2+7x-7$

(c) $x^3+4x^2+3x+12$

(d) $3x^3+18x^2-4x-24$

(e) $2x^3 - 8x^2 + 5x - 20$

(f) $5x^3 - 15x^2 - 2x + 6$

(g) $6x^3 + 30x^2 - x - 5$

(h) $9x^3 + 63x^2 + 8x + 56$

Review Section:

___ 3.) The product of $6x^3y^3$ and $2x^2y$ is

(1) $3xy^2$
(2) $8x^5y^4$
(3) $12x^5y^4$
(4) $12x^6y^3$

___ 4.) An example of an algebraic equation is

(1) $r^2 + 1$
(2) $2a + (n - 1)d$
(3) $5x = 7$
(4) $-25\pi + 100$

5.) What is the result when $6x^2 - 4x + 3$ is subtracted from $3x^2 - 2x + 3$? Make sure to show all your work.

Name _____ Date _____ Period _____

Algebra ***Homework Answers*** Factoring Polynomials (Day 2) 7D HW

1) a) $(x+1)(3x-4)$

b) $(x+5)(x^2+2)$

c) $(x+4)(5x-3)$

d) $(x-2)(7x+1)$

e) $(x-6)(11x+2)$

f) $(x+1)(2x^2-7)$

g) $(x+2)(9x^2+7)$

h) $(3x+4)(x-5)$

i) $(8x^2+11)(x-4)$

j) $(12x-5)(x+9)$

2.) a) $(3x+2)(x^2+5)$

b) $(x-1)(4x^2+7)$

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

d) $(x+6)(3x^2-4)$

e) $2(x-2)(x^2+2)$

f) $(x-3)(5x^2-2)$

g) $2(x+5)(3x^2-1)$

h) $(x+7)(9x^2+8)$

3.) 3

4.) 3

5.) $-3x^2+2x$

Name _____ Date _____ Period ____
Algebra Trinomial Factoring (Sum) 7E

Exercise 1: Write each of the following products in equivalent trinomial form.

(a) $(x+5)(x+3)$ (b) $(2x-3)(5x-1)$

Factoring

Example) Factor $2x^2-7x+6$

Step 1 – List out a,b, and c

$2x^2-7x+6$

ax^2+bx+c

$a=2$

$b=-7$

$c=6$

Step 2 – Split the middle term

$2x^2-7x+6$

Step 3 – Determine the two middle term signs

Look at the last sign

Because $(+)$ **S**um the signs are the **S**ame

The signs are the same as the first sign $(+)$

$2x^2$ ___x ___x $+6$

$2x^2-$ ___x $-$___x $+6$

Step 4 – To figure out the coefficients needed

multiply $(a\cdot c)=(2\cdot 6)=12$

Therefore we will need factors of 12 with a sum of 7

$Factors\ (a)(c)$	$Sum\ (b)$
$Factors\ 12$	$Sum\ 7$
$1, 12$	13
$2, 6$	8
$\mathbf{3, 4}$	**7**

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

Step 5 – Factor a GCF out of the created binomials

$x(2x-3)$ $-2(2x-3)$

Step 6 – Factor out the common binomial to create a second binomial

$\boxed{(2x-3)\,(x-2)}$

Exercise 2: Answer the following questions completely.

(a) $12x^2 - 7x + 1$

(b) $10x^2 + 9x + 2$

(c) $b^2 - 14b + 45$

(d) $x^2 + 8x + 12$

Name _____ Date _____ Period ___
Algebra Trinomial Factoring (Sum) 7E HW

1) Which of the following products is equivalent to the trinomial $x^2 - 5x - 24$?

(1) $(x-12)(x+2)$ (3) $(x-8)(x+3)$

(2) $(x+12)(x-2)$ (4) $(x+8)(x-3)$

2) Written in factored form, the trinomial $2x^2 + 15x + 28$ can be expressed equivalently as

(1) $(2x+7)(x+4)$ (3) $(2x+2)(x+14)$

(2) $(2x+4)(x+7)$ (4) $(2x+14)(x+2)$

3) Write each of the following trinomials in equivalent factored form. Remember to show all work that was shown in class.

(a) $x^2 + 12x + 35$

(b) $x^2 - 11x + 28$

(c) $8x^2 - 18x + 9$

(d) $x^2 - 7x + 10$

(e) $x^2 + 12x + 36$

(f) $5x^2 - 21x + 4$

(g) $2x^2 + 13x + 21$

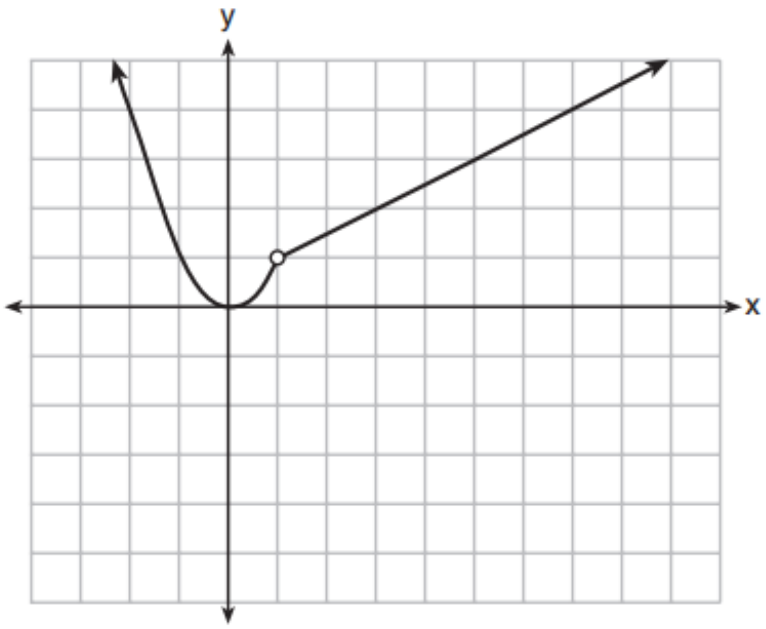
(h) $x^2 - 5x + 6$

Review Section:

4) Express the product of $2x^2 + 7x - 10$ and $x + 5$ in standard form.

There is another question below

5) A function is graphed on the set of axes below.



Which function is related to the graph?

(1) $f(x) = \begin{cases} x^2, & x < 1 \\ x - 2, & x > 1 \end{cases}$

(2) $f(x) = \begin{cases} x^2, & x < 1 \\ \frac{1}{2}x + \frac{1}{2}, & x > 1 \end{cases}$

(3) $f(x) = \begin{cases} x^2, & x < 1 \\ 2x - 7, & x > 1 \end{cases}$

(4) $f(x) = \begin{cases} x^2, & x < 1 \\ \frac{3}{2}x - \frac{9}{2}, & x > 1 \end{cases}$

Name _____ ***Homework Answers*** Date _____ Period _____

Algebra Trinomial Factoring (Sum) 7E HW

1) 3

2) 1

3) (a) $(x+7)(x+5)$ (b) $(x-7)(x-4)$ (c) $(2x-3)(4x-3)$

(d) $(x-5)(x-2)$ (e) $(x+6)(x+6)$ (f) $(x-4)(5x-1)$

(g) $(2x+7)(x+3)$ (h) $(x-3)(x-2)$

4) $2x^3+17x^2+25x-50$

5) 2

Name _____ Date _____ Period ___
Algebra Trinomial Factoring (Difference) 7F

Factoring

Example) Factor: $9x^2 + 35x - 4$

Step 1 – List out a,b, and c

$9x^2 + 35x - 4$

$ax^2 + bx + c$

$a = 9$

$b = 35$

$c = -4$

Step 2 – Split the middle term

$9x^2 + 35x - 4$

Step 3 – Determine the two middle term signs

Look at the last sign

Because $(-)$ **D**ifference the signs are the **D**ifferent

One sign will be $(+)$ and the other $(-)$

$9x^2$ __x ___$x - 4$

$9x^2 +$ __x $-$___$x - 4$

Step 4 – To figure out the coefficients needed

multiply $(a \cdot c) = (9 \cdot 4) = 36$

Therefore we will need factors of 36 with a difference of 35

$Factors\ (a)(c)$	$Difference\ (b)$
$Factors\ 36$	$Difference\ 35$
1, 36	**35**
2, 18	16
3, 12	9
4, 9	5
6,6	0

$9x^2 + 36x - 1x - 4$

Step 5 – Factor a GCF out of the created binomials

$9x(x + 4) - 1(x + 4)$

Step 6 – Factor out the common binomial to create a second binomial

$(x + 4)\ (9x - 1)$

Examples:

1) $7x^2 + 19x - 6$

2) $7x^2 - 19x - 6$

3) $s^2 + s - 56$

4) $2x^2 + 5x - 33$

5) $3x^2 + 11x - 4$

Name _____ Date _____ Period ___

Algebra Trinomial Factoring (Difference) 7F HW

1) Write the following in equivalent trinomial form *(If you need help, look at Exercise 1 from lesson 7E)*.

(a) $(2x-3)(5x+1)$ (b) $(6x+7)(x+2)$

2) Write each of the following trinomials in equivalent factored form. Remember to show all work that was shown in class.

(a) $x^2-3x-18$ (b) $x^2+3x-40$

(c) $7x^2+11x-6$ (d) $x^2-10x-24$

(e) $2x^2 - x - 10$

(f) $3x^2 + 16x - 12$

(g) $6x^2 + 5x - 4$

(h) $x^2 + 8x - 9$

Review Section:

3) In the equation $x^2 + 10x + 24 = (x + a)(x + b)$, b is an integer. Find algebraically *all* possible values of b.

There is another question below

4) The table below shows the average diameter of a pupil in a person's eye as he or she grows older.

Age (years)	**Average Pupil Diameter** (mm)
20	4.7
30	4.3
40	3.9
50	3.5
60	3.1
70	2.7
80	2.3

What is the average rate of change, in millimeters per year, of a person's pupil diameter from age 20 to age 80?

(1) 2.4
(2) 0.04
(3) −2.4
(4) −0.04

Name _____ ***Homework Answers*** Date _____ Period _____

Algebra Trinomial Factoring (Difference) 7F HW

1) (a) $10x^2 - 13x - 3$ (b) $6x^2 + 19x + 14$

2) (a) $(x - 6)(x - 3)$ (b) $(x + 8)(x - 5)$

(c) $(x + 2)(7x - 3)$ (d) $(x - 12)(x + 2)$

(e) $(2x - 5)(x + 2)$ (f) $(x + 6)(3x - 2)$

(g) $(3x + 4)(2x - 1)$ (h) $(x + 9)(x - 1)$

3) 6 or 4

4) 4

Name _____ Date _____ Period ____
Algebra Trinomial Factoring (Combination) 7G

Let's try factoring when everything is all mixed!
Write each of the following trinomials in equivalent factored form.

1) $x^2 + 10x + 16$

2) $x^2 - 8x + 15$

3) $11x^2 - 10x - 1$

4) $x^2 + 30x + 200$

5) $10x^2 - 13x - 3$

6) $x^2 - 15x + 50$

7) $x^2 + 5x - 14$

8) $7x^2 - 26x - 8$

Name _____ Date _____ Period ____
Algebra Trinomial Factoring (Combination) 7G HW

Write each of the following trinomials in equivalent factored form. Remember to show all work that was shown in class.

1) $2x^2 - 7x - 30$

2) $g^2 - 10g + 16$

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

4) $2x^2 - 11x + 12$

5) $3x^2 + x - 10$

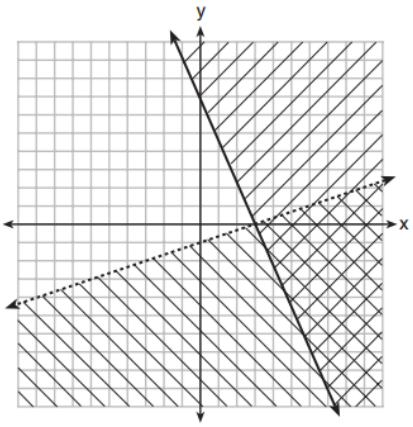
6) $2x^2 + 7x + 6$

7) $9x^2 - 35x - 4$

8) $3x^2 + 16x - 35$

Review Section:

9) Given the system of linear inequalities below, name a point that is in the solution set and one that is not in the solution set.

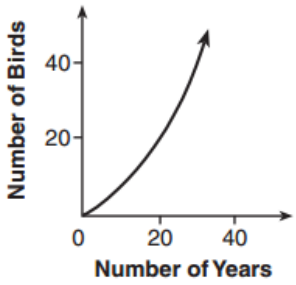


Point in the Solution Set:_____

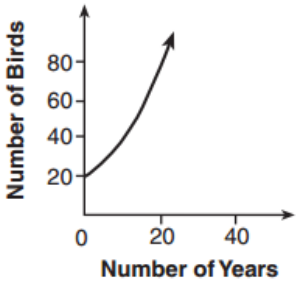
Point *not* in the Solution Set:_____

There are two more questions below

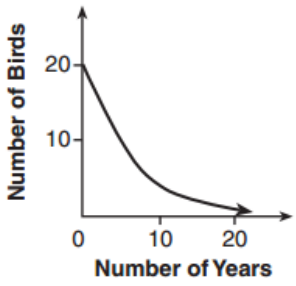
10) A population that initially has 20 birds approximately doubles every 10 years. Which graph represents this population growth?



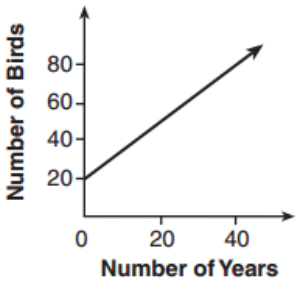
(1)



(3)



(2)



(4)

11) The number of carbon atoms in a fossil is given by the function $y = 5100(0.95)^x$, where x represents the number of years since being discovered.

What is the percent of change each year? Explain how you arrived at your answer.

Name ***Homework Answers*** Date _____ Period _____

Algebra Trinomial Factoring (Combination) 7G HW

1) $(x-6)(2x+5)$

2) $(g-8)(g-2)$

3) $(6x+5)(2x-1)$

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

5) $(x+2)(3x-5)$

6) $(x+2)(2x+3)$

7) $(x-4)(9x+1)$

8) $(x+7)(3x-5)$

9) In: (5,-2) Out: (5,3) There are several possible answers.

10) 3

11) 5 percent decrease

Name _____ Date _____ Period ____
Algebra Factoring with Two Squares 7H

Example) Factor: $x^2 - 36$

Step 1 – List out a,b, and c
$x^2 - 36$
$ax^2 + bx + c$

$a = 1$
$b = 0$
$c = -36$

Step 2 – Split the middle term

Step 3 – Determine the two middle term signs
Look at the last sign
Because $(-)$ **D**ifference the signs are the **D**ifferent
One sign will be $(+)$ and the other $(-)$

Step 4 – To figure out the coefficients needed
multiply $(a \cdot c) = (1 \cdot 36) = 36$
Therefore we will need factors of 36 with a difference of 0

$Factors\ (a)(c)$	$Difference\ (b)$
$Factors\ 36$	$Difference\ 0$
1, 36	35
2, 18	16
3, 12	9
4, 9	5
6,6	**0**

$x^2 - 36$
x^2 __x ___x -36
$x^2 + 6x$ $-6x - 36$

Step 5 – Factor a GCF out of the created binomials
$x(x + 6)\ -6(x + 6)$

Step 6 – Factor out the common binomial to create a second binomial
$(x + 6)\ (x - 6)$

Let's try one:
1) $x^2 - 25$

Is there a quicker way to do these?

Example A) Factor: $x^2 - 100$

Step 1 – List out a,b, and c

$x^2 - 100$

$ax^2 + bx + c$

$a = 1$

$b = 0$

$c = -100$

Take note that b = 0

This means special case factoring!

Step 2 – Create two binomial parentheses $x^2 - 100$

Step 3 – Take the square root of each term. (x) (x)

To ensure the "B" term = 0, the signs must be different

$\sqrt{x^2} = x$ $\sqrt{100} = 10$

$\boxed{(x + 10)(x - 10)}$

Example B) Factor: $169 - 9x^2$

Step 1 – List out a,b, and c

$169 - 9x^2$

$ax^2 + bx + c$

$a = -9$

$b = 0$

$c = 169$

Take note that b = 0

This means special case factoring!

Step 2 – Create two binomial parentheses $169 - 9x^2$

Step 3 – Take the square root of each term. (x) (x)

To ensure the "B" term = 0, the signs must be different

$\sqrt{169} = 13$ $\sqrt{9x^2} = 3x$

$\boxed{(13 + 3x)(13 - 3x)}$

Examples:

1) $a^2 - 16$

2) $m^2 - 81$

3) $x^2 - 256$

4) $121 - x^2$

5) $361 - x^2$

6) $484 - m^2$

7) $36x^2 - 25$

8) $4x^2 - 49$

9) $144 - 25x^2$

10) Billy and Sally are having a disagreement about how to factor the expression $x^2 + 64$. Billy is arguing that the factors should be (x+8)(x+8). Sally is saying that the correct factors should be (x+8)(x-8). Who do you think is correct? If you agree with one, explain why. If you don't agree with either one, explain why.

11) $x^2 - 196$

12) $x^2 + 196$

Name _____ Date _____ Period ____
Algebra Factoring with Two Squares 7H HW

Complete all of the following examples. Please show all necessary work in order to receive full credit.

1) $g^2 - 36$

2) $t^2 - 121$

3) $y^2 - 9$

4) $w^2 - 44$

5) $a^2 + 100$

6) $196 - m^2$

7) $49n^2 - 121$

8) $4 - 25x^2$

9) $c^2 - 441$

10) $x^2 - 4x - 21$

11) $9x^2 - 289$

12) $x^2 - 144$

13) $x^2 + 25$

14) $3x^2 - 11x - 4$

15) $k^2 - 81$

16) $g^2 - 49$

17) $x^2 + 16$

18) $m^2 - 11m - 26$

Review Section:

19) If $f(x) = x^2 - 2x - 8$ and $g(x) = \frac{1}{4}x - 1$, for which values of x is $f(x) = g(x)$?

(1) -1.75 and -1.438

(2) -1.75 and 4

(3) -1.438 and 0

(4) 4 and 0

20) Last week, a candle store received \$355.60 for selling 20 candles. Small candles sell for \$10.98 and large candles sell for \$27.98. How many large candles did the store sell?

Name ***Homework Answers*** Date _____ Period _____

Algebra Factoring with Two Squares 7H HW

1) $(g+6)(g-6)$

2) $(t+11)(t-11)$

3) $(y+3)(y-3)$

4) $prime; not\ factorable$

5) $prime; not\ factorable$

6) $(14+m)(14-m)$

7) $(7n+11)(7n-11)$

8) $(2+5x)(2-5x)$

9) $(c+21)(c-21)$

10) $(x-7)(x+3)$

11) $(3x+17)(3x-17)$

12) $(x+12)(x-12)$

13) $prime; not\ factorable$

14) $(x-4)(3x+1)$

15) $(k+9)(k-9)$

16) $(g+7)(g-7)$

17) $prime; not\ factorable$

18) $(m-13)(m+2)$

19) 2

20) 8 large candles

Name _____ Date _____ Period ___
Algebra GCF Combination 7I

Factoring

Example) Factor $6x^2 + 26x + 8$

Step 1 – List out a,b, and c
$6x^2 + 26x + 8$
$ax^2 + bx + c$

$a = 6$
$b = 26$
$c = 8$
Take note all numbers are even
This means you can divide out a GCF!

Step 2 – Identify if the trinomial has a GCF and divide the GCF out.
Now, $a = 3, b = 13, and\ c = 4$

$6x^2 + 26x + 8$
$2\ (3x^2 + 13x + 4)$

Step 3 – Split the middle term

$2\ (3x^2 + 13x + 4)$

Step 4 – Determine the two middle term signs
Look at the last sign
Because (+) **S**um the signs are the **S**ame
The signs are the same as the first sign (+)

$2(\ 3x^2 \_\_x \ \_\_\_x + 4)$

$2(\ 3x^2 + \_\_x + \_\_\_x + 4)$

Step 5 – To figure out the coefficients needed
multiply $(a \cdot c) = (3 \cdot 4) = 12$
Therefore we will need factors of 12 with a sum of 13

$Factors\ (a)(c)$	$Sum(b)$
$Factors\ 12$	$Sum\ 13$
1, 12	**13**
2, 6	8
3, 4	7

$2(\ 3x^2 + 12x + 1x + 4)$

Step 6 – Factor a GCF out of the created binomials

$2(\ 3x(x + 4) + 1(x + 4))$

Step 7 – Factor out the common binomial to create a second binomial

$\boxed{2\ (x + 4)(3x + 1)}$

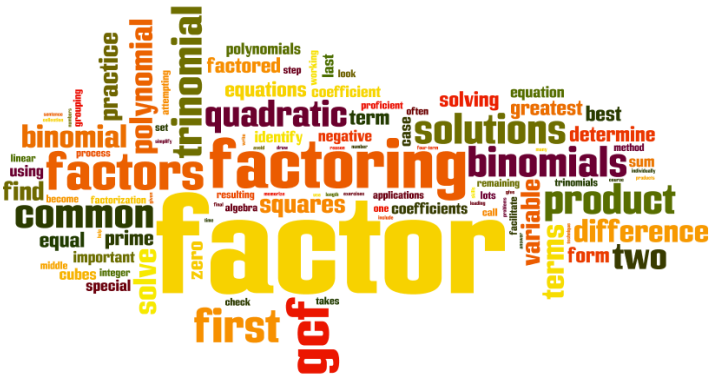
Examples:
1) $10x^2 + 15x - 10$

2) $3g^3 + 27g^2 + 60g$

3) $2x^2 - 18$

4) $4b^2 + 20b + 24$

5) $12x^2 - 3$



Name _____ Date _____ Period ____
Algebra GCF Combination 7I HW

Complete all of the following examples. Please show all necessary work in order to receive full credit.

1) $25r^2 - 100$

2) $100z^2 + 10z - 20$

3) $21w^2 + 93w + 36$

4) $x^2 - 10x + 16$

5) $24d^2 - 6d - 30$

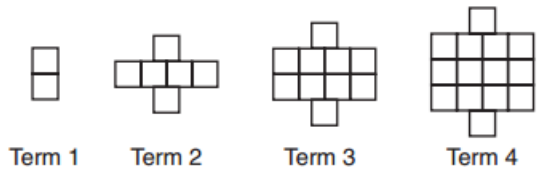
6) $144m^2 - 49$

7) $12s^2 - 22s - 20$

8) $2x^2 - x - 21$

Review Section:

9) A pattern of blocks is shown below.



If the pattern of blocks continues, which formula(s) could be used to determine the number of blocks in the nth term?

I	II	III
$a_n = n + 4$	$a_1 = 2$ $a_n = a_{n-1} + 4$	$a_n = 4n - 2$

(1) I and II
(2) I and III
(3) II and III
(4) III, only

There are two more questions below

10) Dylan invested $600 in a savings account at a 1.6% annual interest rate. He made no deposits or withdrawals on the account for 2 years. The interest was compounded annually. Find, to the *nearest cent*, the balance in the account after 2 years.

11) Albert says that the two systems of equations shown below have the same solutions.

First System	Second System
$8x + 9y = 48$ $12x + 5y = 21$	$8x + 9y = 48$ $-8.5y = -51$

Determine and state whether you agree with Albert. Justify your answer.

Name ***Homework Answers*** Date _____ Period _____

Algebra GCF Combination 7I HW

1) $25(r+2)(r-2)$

2) $10(2z+1)(5z-2)$

3) $3(w+4)(7w+3)$

4) $(x-8)(x-2)$

5) $6(4d-5)(d+1)$

6) $(12m+7)(12m-7)$

7) $2(2s-5)(3s+2)$

8) $(2x-7)(x+3)$

9) 3

10) \$619.35

11) $y = 6$ *and* $x = -\frac{3}{4}$; *I agree with Albert. Both share the same solution.*