Name: _____ Period:_____ Date: _____

Summer Homework

Happy Summer vacation! The math department at Atlantis Charter School wants you to become a successful mathematician this upcoming school year. This summer packet has been designed to help you fine tune the math skills essential to the upcoming school year.

A few important key points:
- This packet is due the day you get back to school in the fall
- Everyone question should be completed
- You may be quizzed on the material in this packet when you return to school.

I understand that summer homework can feel overwhelming, below is a pacing guide to help you tackle this packet a little at a time.

Week 1	Order of Operations and Adding/Subtracting
Week 2	Multiplying Exponents and Dividing Exponents
Week 3	Multiplying Binomials
Week 4	Factoring binomials using GCF

I can't wait to see what we can accomplish in the coming school year!

Sincerely,
Your Future Math Teacher

Order of Operations

When solving problems with multiple steps remember to follow the order of operations.

1. Parenthese

2. Exponents

3. Multiplication and Division (from left to right)

4. Addition and Subtraction (from left to right)

Directions: Evaluate the following expressions using order of operations.

1) $(3^2 + 2 \times 3) \div 5 =$

2) $3 \times 8 - (3 \times 2 + 7) =$

3) $6 + 7 \times 3 - 9 \times 2 =$

4) $2(4 + 3^2 - 5) =$

5) $- 3(2^3 + 4^2 - 15) =$

6) $2 + 4 - 16 + 1^2 =$

Adding and Subtracting

A few examples:

1) $2 + 4 = 6$

2) $-2 - 5 = -7$

3) $5 - -5 = 5 + 5 = 10$

4) $-2 + 8 = 6$

Directions: Add and subtract the following numbers.

1) $-12 + 3 =$

2) $4 - -5 =$

3) $12 - 4 =$

4) $-1 - 27 =$

5) $19 - -4 =$

6) $-8 + 32 =$

7) $-14 + 2 =$

8) $10 - 5 =$

9) $-2 - -8 =$

10) $-12 + 9 =$

Multiplying Exponents

Rule: $(x^a)^b = x^{a \cdot b}$	Example: $(x^2 y^3)^3 = x^6 y^9$
Rule: $x^a \cdot x^b = x^{a+b}$	Example: $x^3 \cdot x^5 = x^8$

Direction: Simplify the following expressions:

1) $x \cdot x^2 \cdot x^3 \cdot x^4 \cdot x^5 =$

2) $(x^2)^2 (3x)(2x^3)^2 =$

3) $(12x^3)(2x^3)(4x^2) =$

4) $x^3 \cdot x^4 \cdot x^2 \cdot 2x =$

5) $7v^3 \cdot 10u^3 v^5 \cdot 8uv^3 =$

6) $(2b^2)^4 =$

7) $(x^4)^6 =$

8) $(2x^3 y^2)^4 =$

Dividing of Exponents

Rule: $\dfrac{x^a}{x^b} = x^{a-b}$	Ex: $\dfrac{x^6}{x^4} = x^{6-4} = x^2$	Ex: $\dfrac{x^3}{x^{-2}} = x^{3--2} = x^{3+2} = x^5$

Directions: Divide the following expressions

1) $\dfrac{(5k)(-8k^5)}{10k^3} =$

2) $\dfrac{4x^2y^3z^4}{2xy^2z^3} =$

3) $\dfrac{4x^3y^5z^4}{2xy^9z^5} =$
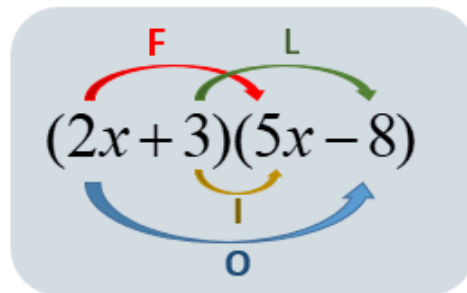
4) $\dfrac{-4x^2y^3}{2xy^2} =$

5) $\dfrac{14x^4y^7}{6x^5y^4} =$

6) $\dfrac{18x^8y^8}{10x^3} =$

Multiplying Binomials

One way to multiply binomials is to use what is called the FOIL method.

FOIL Method

$$(2x+3)(5x-8)$$

F   L
I   O

First: $(2x)(5x) = 10x^2$

Outer: $(2x)(-8) = -16x$

Inner: $(3)(5x) = 15x$

Last: $(3)(-8) = -24$

$(2x+3)(5x-8)$

$= 10x^2 - 16x + 15x - 24$

$= 10x^2 - x - 24$

Another way is by using Box Method.

$(x-5)(6x+12)$

$6x^2 - 18x - 60$

	x	-5
6x	$6x^2$	-30x
+12	12x	-60

Directions: Multiply using either the Box Method or FOIL Method:

1. $(x + 7)(x - 7)$

2. $(- 3x - 9)(- x - 6)$

3. $(3x + y)(3x - 2y)$

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

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

6. $(x - 4)(x - 8)$

7. $(3x + 1)(x - 10)$

8. $(2x - 2)(3x - 1)$

Challenge:

$$(2x^2 - 3x)(6x + 9)$$

Factoring Using the Greatest Common Factor (GCF)

Greatest Common Factor: The greatest common factor is the biggest factor that each term can be divided by without having a remainder.

Steps:
1. List the factors for each term
2. The biggest factor they share is the GCF
3. Look at the variables
4. If both terms have the same variable, take out the variable with the SMALLEST exponent
5. Divide each term by the GCF to find what goes in the parentheses.

ex) $4x^2 - 18x$

Factors of 4- 1x4 and 2x2   *Factors of 18-* 1x18 , 2x9, and 3x6

         Biggest factor they share: 2

Variables: $x^2 = x \cdot x$ $x = x$

         They share: x

GCF: 2x

Divide each term by the GCF: $4x^2 \div 2x = 2x$ and $-18x \div 2x = -9$

Answer: 2x (2x - 9)

Directions: Factor the following binomials by finding a GCF.

1) $3x - 9$

2) $2x^2 + 16x$

3) $12x^2 - 27x$

4.) $5x - 25$

5) $20x + 30$

6) $14x^2 + 49x$