Snow Packet Days 6 – 10

Algebra 1 & Algebra 1 Support

Blocks 1 & 2

(Notes and Assignment included)

Mrs. Penni Powell

Please contact me with any questions using
-LiveGrades messaging
-Email at penni.powell@k12.wv.us
-Remind App messaging using class codes listed below
Class codes 1st block: @ehspowell1
2nd block: @ehspowell2

TASKS FOR DAYS 6 – 10

Day 6 – Power of Quotients Property

Objective: The learner will be able to simplify an exponential expression using the power of quotient property.

Task: Read over notes & complete Power of Quotient Property Scavenger Hunt

For additional examples and explanations, refer to pg. 294 example 4 in your textbook.

Day 7- Exponents Laws Wrap-up

Objective: The learner will be able to simplify exponential expressions using a variety of exponential properties.

Task: Read over Exponent Laws notes & complete Properties of Exponents Worksheet

For additional examples and explanations, refer to pgs. 292 – 294 examples 1 – 4 in your textbook.

Day 8 – Introduction to Polynomials

Objective: The learner will be able to find the degrees of monomials, classify polynomials and order polynomials in standard form.

Task 1: Read over notes & complete pg. 362 (5 – 21) from the textbook.

Task 2: Define and write an example for each *core vocabulary* term for the section.

For additional examples and assistance, refer to pgs. 358 – 359, examples 1 – 3 in your textbook.

Day 9 – Adding & Subtracting Polynomials

Objective: The learner will be able to add and subtract polynomials.

Task 1: Read over notes & complete the self-checking worksheet, *"Did you hear about…"*

For additional examples and assistance, refer to pg. 360, examples 4 & 5 in your textbook.

Day 10 – Multiplying Binomials

Objective: The learner will be able to multiply binomials using the distributive property and the FOIL Method.

Task 1: Read over notes & complete the self-checking Multiplying Binomials Maze

Task 2: Define and write an example for each *core vocabulary* term for the section.

For additional examples and assistance, refer to pages 366 – 367, examples 1 – 3 in your textbook.

***Remember you must show all work for each assignment to earn credit!**

If additional practice is needed, I encourage you to find lessons on IXL to practice. Logon through your clever account. In the IXL search bar, search for lessons using the title of the day, such as "adding & subtracting polynomials" and pick an Algebra 1 lesson. Finally, work through questions until you get a Smart Score of 80!

Lastly, for all textbook references/assignments, you should have an issued textbook at home or you can utilize your online textbook (Big Ideas Math).

Day 6: Power of Quotient Property

POWER OF QUOTIENT PROPERTY NOTES

When we have a quotient raised to an additional power, we must follow the following steps to simplify the exponential expression:

$$\left(\frac{3m^5}{8n^2}\right)^4$$

$\frac{3m^5}{8n^2}$ represents a *quotient*

The exponent 4 represents that quotient being raised to a *power*

Step 1: Keep all bases the same. Remember that coefficients (numbers before a variable) are bases too!

Bases to be kept the same: 3, m, 8, n

Step 2: Distribute the outside exponent to all inside exponents. This means we multiply each inside exponent by the outside exponent.

$$\frac{3^{1\bullet4}m^{5\bullet4}}{8^{1\bullet4}\,n^{2\bullet4}}$$

Step 3: Simplify, as necessary

$$\frac{3^4m^{20}}{8^4\,n^8}$$

PRACTICE QUESTION:

#1) $\left(\frac{x^{10}}{20x^2}\right)^2 = \frac{x^{10\bullet2}}{20^{1\bullet2}\,x^{2\bullet2}} = \frac{x^{20}}{20^2\,x^4} = \frac{x^{20-4}}{20^2} = \frac{x^{16}}{20^2}$

Notice, this example had an extra step! That's because we had a "quotient of powers" problem to simplify also! Don't forget all properties are possible!

POWER OF A QUOTIENT PROPERTY SCAVENGER HUNT WORKSHEET #2

Name: ____________________

Hour: ____________________

Solve the first problem in the box below where it says START. The answer to this problem will lead you to the next problem to be completed. Your answer should be in one of the gray rectangular boxes. Complete the next problem (place a 2 in the starburst bubble) and so on until you have finished all twelve problems. Your last problem should be the answer in the start box.

START $\frac{4}{9x^4}$ Your last answer	**IF YOU FOUND . . .** $\frac{1}{x^4}$	**IF YOU FOUND . . .** x^{27}
$\left(\frac{x^{\frac{3}{5}}}{x^2}\right)^{-5}$ 1	$\left(\frac{2x^2y^3}{3xy}\right)^4$	$\left(\frac{x^{\frac{2}{5}}}{x}\right)^{10}$
IF YOU FOUND . . . 1	**IF YOU FOUND . . .** $\frac{36}{x}$	**IF YOU FOUND . . .** $8x^{12}$
$\left(\frac{2x^4y^2}{4x^2y^2}\right)^{-2}$	$\left(\frac{3x^3}{2x}\right)^{-2}$	$\left(\frac{2x^{\frac{1}{2}}}{12}\right)^{-2}$
IF YOU FOUND . . . x^7	**IF YOU FOUND . . .** $\frac{1}{x^6}$	**IF YOU FOUND . . .** $\frac{x}{25}$
$\left(\frac{2x^{\frac{1}{2}}}{10}\right)^2$	$\left(\frac{17}{4x^2}\right)^0$	$\frac{3x^3}{(3x)^3}$
IF YOU FOUND . . . $\frac{4}{x^4}$	**IF YOU FOUND . . .** $\frac{1}{9}$	**IF YOU FOUND . . .** $\frac{16x^4y^8}{81}$
$\left(\frac{2x^{-3}}{4x}\right)^{-3}$	$\left(\frac{x^3x}{x^2}\right)^{-2}$	$\left(\frac{x^{\frac{3}{5}}}{x^6}\right)^{-5}$

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DAY 7: Properties of Exponents Wrap-up

Use this document and your notes to help you with the following assignment. This assignment is a review of all six properties of exponents you learned in class and with Day 6's assignment.

Exponent Laws

* use these in place of notes from last week *

ax^n	a coefficient x base n exponent

	Operation	Explanation	Symbols	Example
Product of Powers	Multiplication	ADD the exponents and keep the same base	$x^n \times x^m = x^{n+m}$	$5^2 \times 5^4 = 5^{2+4} = 5^6$
Quotient of Powers	Division	SUBTRACT the exponents and keep the same base	$x^n \div x^m = x^{n-m}$ OR $\frac{x^n}{x^m} = x^{n-m}$	$\frac{10^7}{10^3} = 10^{7-3} = 10^4$
Negative Exponents	Negative Exponents	Make a fraction with numerator of ONE. Denominator is base with same POSITIVE exponent.	$x^{-n} = \frac{1}{x^n}$ * Move the base + negative exponent to the opposite side of the fraction to make it positive.	$4^{-2} = \frac{1}{4^2} = \frac{1}{16}$
Zero Exponent	Anything to the zero power	Equals ONE! (except for 0^0)	$X^0 = 1$ NOTE: 0^0 is undefined!	$7^0 = 1$ 0^0 = undefined
Power of a Power	Raise a power to a power	Multiply the exponents	$(x^n)^m = x^{n \times m}$	$(8^4)^3 = 8^{12}$
Power of a Quotient	raising fraction to a power	Raises both the numerator and denominator to the exponent	$(\frac{x}{y})^n = \frac{x^n}{y^n}$	$(\frac{1}{2})^3 = \frac{1^3}{2^3} = \frac{1}{8}$

DAY 7: Properties of Exponents Wrap-up continued

Properties of Exponents Worksheet Name_______________

Evaluate the expression.

1. $4^2 \cdot 4^4$
2. $(5^{-2})^3$
3. $\frac{5^2}{5^5}$
4. $\left(\frac{3}{7}\right)^3$
5. $\frac{2^2}{2^{-9}}$
6. $(-9)(-9)^3$

Simplify the expression.

7. $a^6 \cdot a^3$
8. $(x^5)^2$
9. $(4a^2b^3)^5$
10. $\frac{x^8}{x^6}$
11. $\frac{x^5}{x^8}$
12. $\frac{x^6}{x^6}$
13. $\left(\frac{4a^3}{2b^4}\right)^2$
14. $(2^3x^2)^5$
15. $(x^4y^7)^{-3}$
16. $\frac{x^{11}y^{10}}{x^{-3}y^{-1}}$
17. $-3x^{-4}y^0$
18. $\frac{5x^3y^9}{20x^2y^{-2}}$
19. $\frac{x^5}{x^{-2}}$
20. $\frac{x^5y^2}{x^4y^0}$
21. $(x^3)^0$
22. $(10x^5y^3)^{-3}$
23. $\frac{x^{-1}y}{xy^{-2}}$
24. $(4x^2y^5)^{-2}$
25. $\frac{2x^2y}{6xy^{-1}}$
26. $\frac{xy^9}{3y^{-2}} \cdot \frac{-7y}{21x^5}$
27. $\frac{12xy}{7x^4} \cdot \frac{7x^5y^2}{4y}$

DAY 8: Introduction to Polynomials

Introduction to Polynomials Notes

Let's start with ***what is a polynomial?*** If we break down the word *polynomial*, we will notice the prefix *poly which means* many. So, polynomials represents ***many*** of something. A polynomial is a sum (addition) of one or many monomials. So, let's talk about what a monomial is. A monomial is a number, variable or the product (product) of the a number and variable.

Examples of a monomial include: 8x, 19mn, 25, y, $6pq^5$

As you can see, each of this is either a number, variable or a product of numbers and variables, defining what a monomial is.

So, if we were to have a polynomial, we would have a sum of one or many polynomials. Such as the following:

$12x^5 + 10x^3 + 8x^2 + 17$ ← We have four different monomials being added together, therefore, we have a polynomial!

Now, let's talk about the degree of a monomial. A degree of a monomial is determined by the sum of the exponents of the variables. Simply put, if you are asked to determine the degree of a monomial, simply add the exponents for the variables!

Example:

Monomial	Degree & Reasoning
8x	1 (x has an exponent of 1)
19mn	2 (m and n both have an exponent of one. Add both exponents together and get a sum of 2)
$6pq^5$	6 (p has an exponent of 1, while q has an

	exponent of 5. Added together the degree is 6).
10	0 (There are no variables, therefore, the degree is zero)

Next, let's discuss how to write a polynomial in <u>standard form</u>. To put a polynomial in standard form we must follow the following steps:

Step 1: identify the degree for each monomial.

Step 2: Determine which monomial has the greatest degree, second largest all the way to the smallest degree.

Step 3: Put the monomials in orders from greatest to least by degree.

Example: 8p + 19pq – 25 + $2q^3$ - $6pq^5$

Step 1: Identify the degree per monomial

8p + 19pq – 25 + $2q^3$ - $6pq^5$

(1) (2) (0) (3) (6)

Step 2: Determine which monomial is the largest to the smallest.

Step 3: Put the monomials in order from greatest to least. Keep in mind the sign in front of the monomial must stay in front of the same monomial.

- $6pq^5$ + $2q^3$+ 19pq + 8p – 25

This is standard form! Woohoo!

Alright, we are almost there! The last thing for us to do, is to classify a polynomial. When classifying a polynomial there are four things we must do.

#1 Put the polynomial in standard form (Good news, you know how to do this now!) Always do this first! It helps with the remaining steps.

#2 Identify the degree of the polynomial.

The degree of the polynomial is the greatest degree of all its terms. So, it's the degree of the first monomial only, as it has the largest degree amount.

#3 Identify the leading coefficient of the polynomial.

The leading coefficient is the coefficient of the first monomial in standard form.

#4 Identify the type of polynomial.

The type of the polynomial is simple! If it has one monomial, it's a monomial, two monomials, it's a BI-nomial, three monomials, it's a TRI-nomial, and we stick to polynomial after three.

So, let's give this a try!

Example: Write the polynomial in standard form, identify the degree, identify the leading coefficient and classify the polynomial by the number of terms.

$$8p + 2q^3 - 6p^5$$

Standard form	Degree of the polynomial	Leading coefficient	Type of Polynomial
Put the monomials in order from greatest to least degree	Look at the first monomial. The degree of that monomial is the degree of the polynomial. $-6p^5$	Look at the first monomial. The coefficient is the leading coefficient of the polynomial. $-6p^5$	How many monomials are there in this polynomial? Three, so use that to identify the type.
$-6p^5 + 2q^3 + 8p$	5	-6	Trinomial

Now it's time for you to try all of this out!

Get your text book, complete pg. 362 (5 – 21) from the textbook.

Then, Define and write an example for each *Core vocabulary* term for the section.

ASSIGNMENT IS RIGHT HERE!

Adding & Subtracting Polynomials Notes

◆ **Skill A** Adding polynomials

Recall To add two polynomials, add the coefficients of like terms.

◆ **Example 1**
Add the polynomials horizontally.
$3a^3 + 2a^2 + a + 5$ and $2a^3 + 4a - 6$

◆ **Solution**
Group like terms.
$(3a^3 + 2a^2 + a + 5) + (2a^3 + 4a - 6)$
$= (3a^3 + 2a^3) + 2a^2 + (a + 4a) + (5 - 6)$
$= 5a^3 + 2a^2 + 5a - 1$
The sum of $3a^3 + 2a^2 + a + 5$ and $2a^3 + 4a - 6$ is $5a^3 + 2a^2 + 5a - 1$.

◆ **Example 2**
Add the same two polynomials vertically.

◆ **Solution**
Line up the variables. Use zero for the coefficient of any missing variable.

$$\begin{array}{r} 3a^3 + 2a^2 + 1a + 5 \\ \underline{+\ 2a^3 + 0a^2 + 4a - 6} \\ 5a^3 + 2a^2 + 5a - 1 \end{array}$$

The sum of $3a^3 + 2a^2 + a + 5$ and $2a^3 + 4a - 6$ is $5a^3 + 2a^2 + 5a - 1$.

◆ **Skill B** Finding the opposite of a polynomial

Recall To find the opposite of a term, change the sign in front of the term.

◆ **Example**
Find the opposite of $2b^2 + 3b - 7$.

◆ **Solution**
The opposite of $2b^2 + 3b - 7$ is $-(2b^2 + 3b - 7)$.
$-(2b^2) = 2b^2$; $-(3b) = -3b$; $-(-7) = 7$
Thus, $-(2b^2 + 3b - 7) = -2b^2 - 3b + 7$.

◆ **Skill C** Subtracting polynomials

Recall To subtract a polynomial, add its opposite.

◆ **Example**
Subtract $2c^2 - 3c - 5$ from $5c^2 - 2c + 3$.

◆ **Solution**
$(5c^2 - 2c + 3) - (2c^2 - 3c - 5) = (5c^2 - 2c + 3) + (-2c^2 + 3c + 5)$
$= 3c^2 + c + 8$
$2c^2 - 3c - 5$ subtracted from $5c^2 - 2c + 3$ is $3c^2 + c + 8$.

Complete each addition or subtraction problem, putting the polynomial in standard form

Did You Hear About . . .

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

Subtract the polynomials. Write the word next to the correct answer in the box containing the exercise number.

1 $\begin{array}{r} 9u + 4 \\ -(5u + 8) \\ \hline \end{array}$

2 $\begin{array}{r} 10u^2 - 3 \\ -(2u^2 + 9) \\ \hline \end{array}$

3 $\begin{array}{r} 16u^2 + 5u \\ -(7u^2 - 12u) \\ \hline \end{array}$

4 $\begin{array}{r} 3u^2 + 8u - 1 \\ -(11u^2 - u + 6) \\ \hline \end{array}$

5 $\begin{array}{r} 4u^2 - 7u - 7 \\ -(15u^2 - 2u + 3) \\ \hline \end{array}$

6 $\begin{array}{r} 5u^2 + 5u - 2 \\ -(-4u^2 + 6u - 13) \\ \hline \end{array}$

7 $(8u^2 - 3u + 11) - (2u^2 - 5u - 4)$

8 $(-x^2 + 7x + 10) - (-5x^2 + 2x - 18)$

9 $(6x^3 + x^2 - 9x) - (-3x^3 + 4x^2 - 9x)$

10 $(5x^3 - 12x^2 + 2x) - (2x^3 - 7x^2 + 14)$

11 $(3x^4 - 4x^2 - 9) - (-8x^2 - 5x - 1)$

12 $(x^4 - 7x^3 + 16x^2) - (7x^2 - 2x^4)$

13 $(-2x^2 + 9xy - 5y^2) - (x^2 + 6xy - 11y^2)$

14 $(8x^2 + 3xy - 20y^2) - (-4x^2 + 3xy + 20y^2)$

Answers 1-7

- $6u^2 - 2u - 10$ • FRIEND
- $-11u^2 - 5u - 10$ • THE
- $8u^2 - 10$ • GIANT
- $4u - 4$ • THE
- $6u^2 + 2u + 15$ • ANT
- $-8u^2 + 9u - 7$ • AND
- $9u^2 - 3u + 15$ • SPIDER
- $8u^2 - 12$ • BOY
- $9u^2 - u + 11$ • GIRL
- $-8u^2 - 7u - 5$ • WHO
- $9u^2 + 17u$ • ANT

Answers 8-14

- $3x^4 - 7x^3 + 9x^2$ • BECAME
- $4x^2 - 5x - 8$ • RUNNING
- $9x^3 - 3x^2$ • GOT
- $3x^4 + 4x^2 + 5x - 8$ • AND
- $3x^3 - 5x^2 - 4x + 14$ • STUCK
- $-3x^2 + 3xy + 6y^2$ • PAIR
- $3x^3 - 5x^2 + 2x - 14$ • TOGETHER
- $3x^4 + 7x^3 + 4x^2 - 8$ • THEN
- $12x^2 - 40y^2$ • ANTS
- $4x^2 + 5x + 28$ • WHO
- $-3x^2 + 15xy - 6y^2$ • SUGAR

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DAY 10: Multiplying Binomials

Multiplying Binomials Notes

In this section you will learn two methods of multiplying two binomials.

<u>Method 1: Distributive Property</u>

Let's go over a quick reminder of how to use the distributive property. Remember, when we distribute, we multiply the terms together to create a product.

Review Example:

$5x(x^2 + 9)$

$5x \bullet x^2 + 5x \bullet 9$

$5x^3 + 45x$

<u>Steps to using the Distributive Property to Multiply Binomials</u>

$(x + 11)(x + 8)$

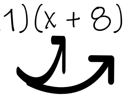
Step 1: Distribute the <u>first</u> term of the first binomial to each term in the second binomial.

$(x + 11)(x + 8)$

$x^2 + 8x$

Step 2: Distribute the <u>second</u> term of the first binomial to each term in the second binomial.

$(x + 11)(x + 8)$



$x^2 + 8x + 11x + 88$

Step 3: Combine like terms.

$x^2 + \underline{8x + 11x} + 88$

$x^2 + 19x + 88$

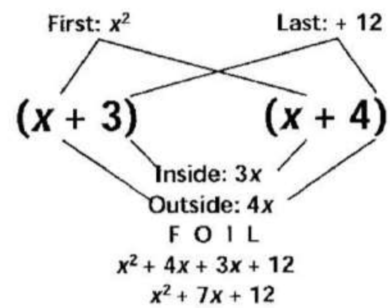
Step 4: Put polynomial in standard form.

$x^2 + 19x + 88$

Method 2: FOIL Method

◆ **Skill C** Using the FOIL method to multiply two binomials

Recall To multiply two binomials,
multiply the **F**irst terms;
multiply the **O**utside terms;
multiply the **I**nside terms;
add the outside and inside products; and
multiply the **L**ast terms.



◆ **Example 1**

Use the FOIL method to find the product $(x + 3)(x - 4)$.

◆ **Solution**

$$\begin{aligned} & \qquad\ \ \mathbf{F} \qquad\quad \mathbf{O} \qquad\quad \mathbf{I} \qquad\quad \mathbf{L} \\ (x + 3)(x - 4) &= (x)(x) + (x)(-4) + (3)(x) + (3)(-4) \\ &= x^2 \quad - 4x \quad + 3x \quad - 12 \\ &= x^2 - x - 12 \end{aligned}$$

The product $(x + 3)(x - 4)$ is $x^2 - x - 12$.

◆ **Example 2**

Use the FOIL method to find the product $(2x - 3)(3x - 1)$.

◆ **Solution**

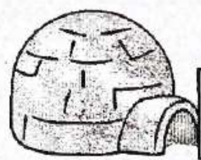
$$\begin{aligned} & \qquad\quad \mathbf{F} \qquad\qquad \mathbf{O} \qquad\qquad \mathbf{I} \qquad\qquad \mathbf{L} \\ (2x - 3)(3x - 1) &= (2x)(3x) + (2x)(-1) + (-3)(3x) + (-3)(-1) \\ &= 6x^2 - 2x - 9x + 3 \\ &= 6x^2 - 11x + 3 \end{aligned}$$

The product $(2x - 3)(3x - 1)$ is $6x^2 - 11x + 3$.

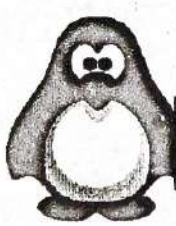
Multiplying Binomials Maze

Name ______________________

Directions: Help Polly Penguin find her way back to her igloo! Solve the problems and follow the correct path to the igloo! Watch out for dead ends!



FINISH	x^2-2x-3	$(x+1)(x-3)$	$X^2-6x-16$	$(x-2)(x+8)$	$X^2-8x+16$	$(x-4)(x-4)$	x^2-9	$(x-3)(x+3)$
$x^2-9x-22$		$x^2+12x+4$		$X^2+6x-16$		$x^2-4x-45$		$x^2+7x+10$
$(x+2)(x-11)$	$x^2+12x+32$	$(x+8)(x+4)$	$x^2+14x+6$	$(x+8)(x+6)$	$x^2-4x+45$	$(x+5)(x-9)$	$x^2-7x+10$	$(x-2)(x-5)$
$x^2+13x+7$		$x^2+9x-36$		$x^2+14x+48$		$x^2-14x-45$		x^2-25
$(x+6)(x+7)$	$x^2+13x+56$	$(x+12)(x-3)$	$x^2-2x-15$	$(x+3)(x-5)$	x^2+8x-5	$(x-13)(x+3)$	$x^2-10x-39$	$(x-5)(x+5)$
$x^2+12x+27$		$x^2+15x-3$		$x^2+14x+14$		$x^2+11x+28$		x^2-6x-7
$(x-3)(x+9)$	$x^2+6x-27$	$(x-1)(x+1)$	x^2-1	$(x+2)(x+7)$	X^2+9x+7	$(x-7)(x-4)$	$x^2-11x+28$	$(x+1)(x-7)$
$x^2+3x-40$		x^2-2x-1		$X^2+9x+14$		$x^2-7x-30$		x^2+7x+7
START $(x+8)(x-5)$	$x^2-3x-40$	$(x-4)(x-9)$	$x^2-13x+36$	$(x-5)(x+6)$	x^2+x-30	$(x-10)(x+3)$	$x^2+7x+30$	$(x-1)(x-7)$



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