RAWLINSON ROAD MIDDLE SCHOOL- Home of Raider PRIDE

Student Name: _____ **Date:** _____

Course: Algebra – Gifted **Teacher:** Abernethy

Teacher Office Hours: 10:00 – 12:00 **Teacher Email:** eabernethy@rhmail.org

Other form of contact if help is needed: text or call me - 8034176228

Instructions to complete the student packet:
Fill in the notes for each section. I can send you the video if possible. Complete each practice then submit each part to me.

Instructions to submit work:
From a phone, use your NOTES APP and click:

- Scan documents
- Keep scan
- Save
- Then in the upper right corner click the send arrow pointed up
- Send as a message by clicking on the green message button.
- Text it to me at 803-417-6228, email me at eabernethy@rhmail.org, or submit it on Canvas.

Technology

Laptop issues: please **email** the help desk- **helpdesk@rhmail.org** or **phone** at **(803)981-3531** and include the following information:

Student ID number (ex: RS12345)

Parent/Guardian name, Parent/Guardian email and phone number contact information.

School Name / Teacher name

A description of the problem with the computer

The Rock Hill Schools Technology Department Staff will be on call between the hours of 8AM - 8PM

Launchpad: https://launchpad.classlink.com/rockhill **Canvas:** https://rockhill.instructure.com/login/canvas

**** For more information on remote learning, please visit:**

RRMS website at https://www.rock-hill.k12.sc.us/domain/2596 or

RHS District website at: https://www.rock-hill.k12.sc.us/elearning

Classifying Polynomials 13.1

1. A **polynomial** is an algebraic expression of one or more _____.

   Ex: $-3x^2y + 7x - 1$

   a. A _____ is a polynomial with **one term**.

   Ex: $5x$; $4a^2b^3c$; $\frac{7xy^3}{z}$

   b. A _____ is a polynomial with **two terms**.

   Ex: $9x + 2$; $-3x^2y - 4x$

   c. A _____ is a polynomial with **three terms**.

   Ex: $5x^2 + 2x - 7$; $-3a^2 - 4ab + 9b^2$

2. The **degree of a term** equals the _____ of the **exponents** of the **variables**.

   a. $5y^3$ - _____ degree

   b. $-3x^2y^4$ - _____ degree

   c. $8x^1y^3$ - _____ degree

   d. $5^2n^1p^1$ - _____ degree

3. The **degree of a polynomial** equals the **degree** of the _____ with the **highest degree.**

   a. $5n^2 - 3n + 2$ _____ degree polynomial

   b. $4x^2y^3 - 5^7y^2$ _____ degree polynomial

   c. $5wxyz - 5y^2 + 2z^3$ _____ degree polynomial

4. To put a polynomial in standard form, place the **highest degree term** _____ and the rest in _____ order with constants (#'s) last.

a. $7x - 5x^2 + 4 + x^3$

b. $3a - 5a^2 - a^3$

c. $8z^2 + z^3 + 2$

5. Distribute and/or add like terms and then place each polynomial in standard form.

a. $8a - 4 + 3a^2 - 2a + 15$

b. $3m + 2(5m^3 - 4m^2 + 7m - 1)$

c. $3(2x + 4) - 4x^2 + 6x + 8x^2$

d. $10 - 4(4n^2 + 3n - 2) - 7n + 11n^2$

6. In your own words, describe how to determine the degree of a polynomial. _____

_____

_____

_____

Standard Form and Classifying Polynomials Name_____

	Standard Form Combine like terms. Order terms from the largest exponent to the smallest exponent.	Classify by Degree Based on the largest exponent. Constant, Linear, Quadratic, Cubic, 4th Degree, 5th Degree.	Classify by Terms Based on the number of terms. Monomial, Binomial, Trinomial, 4 Term Polynomial, 5 Term Polynomial.
1. $9 + 2x^3 – 7x^3 – 2x^3$			
2. $–8 + 9x^5 + 8$			
3. 7			
4. $–8 – 5x^3 + 4x^5 – 4x – 6$			
5. $–3 – 8x^3 – 6x$			
6. $4 + 8x^4$			
7. $–8 + 7x^4$			
8. $–3x^3$			
9. 8			
10. $5 – 8x$			
11. $5 + 7x^5$			
12. 5			
13. $–9x^5 – 7x$			
14. $4x + x$			
15. $9 – 3x^5 – 2x^2$			
16. $–x^2$			
17. $4x^3 + 9x^4 + 7$			
18. 2			
19. $– 9x^4 + 7x^4 – 8$			
20. $3 – 4x^3 + 1$			

Adding & Subtracting Polynomials 7.1

1. A **polynomial** is an algebraic expression of _____ or more _____.

   a. _____ - a polynomial with **one term**.

   b. _____ - a polynomial with **two terms**.

   c. _____ - a polynomial with **three terms**.

$$\frac{(x-2)^2}{16} + \frac{(y-5)^2}{4} = 1$$

2. The degree of a term equals the _____ of the _____ of the _____.

   a. $5y^3$ - _____ degree

   b. $-3x^2y^4$ - _____ degree

   c. $8xy^3$ - _____ degree

   d. 5^2np - _____ degree

3. The **degree of a polynomial** equals the _____ of the _____ **degree** _____.

   a. $5n^2 - 3n + 2$ _____ **degree polynomial**

   b. $4x^2y^3 - 5^7y^2$ _____ **degree polynomial**

   c. $5xyz - 3^4y^2 + 2z^3$ _____ **degree polynomial**

4. Evaluating polynomials - _____ in the value of the variable(s) and _____.

a. $5x^3 - x^2 + 3x - 7$ if $x = -3$

b. $-y^4 + 3xy^3 + 5y^2$ if $x = 5$ $y = -2$

5. Simplified **standard form:** _____ **degree** of the variable terms.

a. $7x - 5x^2 + x^3 + 1$

b. $3xy - 3y^2 - x^2$

c. $z - z^3 + 2z + 11$

d. $-3x^2y + 4x^3 + xy^2 - 11y^3$

6. **Adding polynomials** is **adding** _____ **terms!**

Rule: $ax \pm bx =$

Ex: $9y^3 - 15y^3 =$

a. Simplify the following:

1) $(3x^2 - 5x + 2) + (7x^2 - x - 15)$

2) $(3xy^2 - 5x) + (11xy^2 + 2x) + (8x - 11)$

b. When "**subtracting**" remember to _____ **the negative sign.**

1) $5x^3 + x^2 - 3x + 2 - (7x^3 + 8x^2 - 4x + 9)$

2) $n^2 - 3 - (5n^2 - 2n + 7) - (-4n + 1)$

Adding and Subtracting Polynomials

To add polynomial expressions, combine **like terms**. Like terms have the same variable and same exponent. For example, you can add $3x^2$ to $2x^2$ (which yields $5x^2$) because both terms contain the variable x and the exponent 2. You will not be able to add $5x$ to $11x^3$ because these are *not* like terms – they do not have the same exponent.

Remember to write your final answer in standard form (highest exponent to lowest exponent). See the following completed example:

$(5x^3 - 2x + x^2 + 8) + (2x^2 + 9 - 5x)$

$5x^3 + x^2 + 2x^2 - 2x - 5x + 8 + 9$ ← You may want to may rearrange to get like terms together.

$5x^3 + 3x^2 - 7x + 17$

Find each sum.

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

2. $(-2x^3 + 6x^2 - 3x + 8) + (x^3 + 2x - 7)$

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

4. $(5x^2 - 3x - 1) + (-2x^2 - 6x - 4) + 2x$

Adding and Subtracting Polynomials

In some cases an entire term may disappear (if the sum of their coefficients is zero). See the example:

$(2x + x^2 + 8) + (2x^2 + 9 - 5x) + (5 - 3x^2)$

$x^2 + 2x^2 - 3x^2 + 2x - 5x + 8 + 9 + 5$ ← Rearrange to get like terms together.

$0x^2 - 3x + 22$ ← Notice the first three terms give $0x^2$.

$-3x + 22$ ← Final answer. Leave out the zero term.

Find each sum.

5. $(3x^2 + x - 9) + (x^2 - x + 4)$

6. $(-2x^3 + 5x^2 - 5x + 8) + (2x^3 + 2x - 7)$

7. $(4x^3 - 9x + 5) + (2x^3 - 3x - 5)$

8. $(5x^2 - 3x - 1) + (-6x^2 + x - 8) + 2x$

Adding and Subtracting Polynomials

When subtracting polynomial expressions, you will still combine **like terms**. First, though, distribute any minus signs that appear before parentheses. Example:

$$(5x^3 - 2x + x^2 + 8) - (2x^2 + 9 - 5x)$$

$5x^3 - 2x + x^2 + 8 - 2x^2 - 9 + 5x$ ← Distribute the minus sign.

$5x^3 + x^2 - 2x^2 - 2x + 5x + 8 - 9$ ← Rearrange the terms.

$5x^3 - x^2 + 3x - 1$

Find each difference.

9. $(-2x^3 + 6x^2 - 3x + 8) - (-x^3 + 2x - 7)$

10. $(x^2 - 9) - (7x + 3x^2)$

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

12. $(-x^2 + 3x - 4) - (3x^2 + x - 1)$

Adding and Subtracting Polynomials

Simplify.

13. $12-(x^3+5)$

14. $(x^3-2x^2+1)-x^2$

15. $(8x^2+2)+(5-3x^2)$

16. $(2d-8d^2-3)+(d^2+5d)$

17. $(20x^2-x+5)-(5x^2+3x)+(2-9x)-10$

18. $(5a^2-9a+12)-(-6a^2)+(7a^2+a-10)$

19. $(-5x^2-8y)+(-2xy-3y^2+x^2)+(-x^2+4xy)$

20. $(4x^2+3x^3y^2)-(5x^2-6x^3y^2-2x)-(10x-x^2)$

Multiplying Binomials 7.2

1. The key to multiplying polynomials is to _____.

a. $-3x(5x^3 - 2x^2 + x - 7)$

b. $-2ab^2(3a^2 - 4ab + b^2)$

2. To multiply binomials just _____ .

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

b. $(2y + 5)(3y - 7)$

c. $(5a - 4b)(7a - 2b)$

d. $(3x - 7)^2$

e. $(4n^2 - 3n)(5n - 8)$

3. The _____ **method** is a memory aid to the distributing process.

a. F_____ (x - 2)(2x - 5)

b. O _____ (x - 2)(2x - 5)

c. I _____ (x - 2)(2x - 5)

d. L _____ (x - 2)(2x - 5)

4. Examples

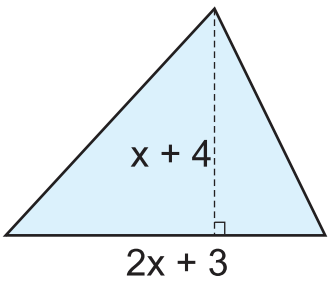
a. $(n - 5)(4n - 3)$

b. $(-a + 6)(3a - 9)$

c. $(-2x - y)(-5x + 7y)$

d. $(x - 7)(x + 7)(2x + 3)$

5. Find the area of the triangle.



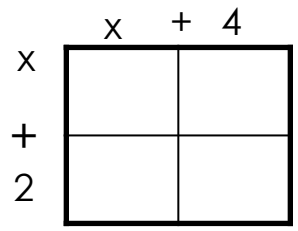
Name _____ Date _____ Per_____

Multiplying Binomials

Steps for the box method

1. Find the area of each small box.
2. Find the area of the large box by combing the areas of all four small boxes.

A. EXAMPLE: Use the box method to find the product of (x+4)(x+2) by finding the area of each individual box and then adding them together. Each binomial has two terms. The side lengths of the small boxes will be represented by the terms from each binomial.



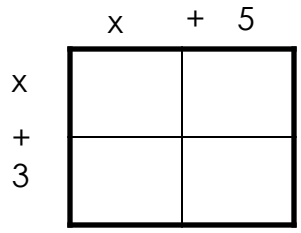
1. determine the area of each box

2. Combine all four small boxes together by addition to find the total area of the large box
_____= (x+2)(x+4)

B. As you work through the problems below, think about what is happening mathematically with the two binomials. How is the area of each small box determined? Try to recognize patterns or repeated procedures and attempt to derive a procedure to multiply the binomials that does not require the use of boxes.

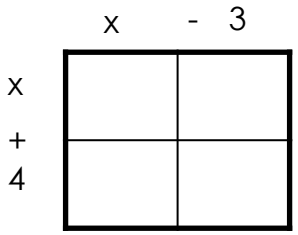
Directions: Use the box method to find the product of the binomials.

1. (x+ 3)(x+ 5)



Answer=_____

2. (x+ 4)(x– 3)



Answer=_____

3. (x+ 1)(x– 7)

Answer=_____

4. (x– 2)(2x– 6)

Answer=_____

C. Looking back at your work from part B, the box method, think about any patterns or repeated procedures that you did. For example, How did you find the area of just one box?

Describe a procedure that ***does not*** require the use of boxes to find the product of the two binomials below.

To multiply (x+4)(x+6) _____

_____

_____

_____

_____

_____

_____

D. Apply the method you described in part C to find the products below. DO NOT use the box method.

a. (x+6)(x+7)	b. (x+2)(x-5)	c. (3x+1)(x-3)
d. (x-2)(x-4)	e. (2x+5)(x-6)	f. (4x+8)(2x-3)

Multiplying Polynomials 7.3

1. Remember, the key to multiplying polynomials is to _____.

   Ex: $(2x - 3)(-4x - 5)$

2. Binomials times polynomials

   a. $(3x + 2)(2x^2 + 5x - 7)$

   b. $(5n - 3)(4n^3 + n^2 - 7n + 6)$

   c. $(-3a^2 - 4a - 2)(6a - 5)$

3. Polynomials times polynomials

   a. $(x^2 - 3x + 2)(2x^2 + 5x - 7)$

   b. $(2n^2 - 3n + 5)(7y - 4)$

c. $(2a^2b - 4ab)(3a^2 - 2ab + 5b^2)$

d. $(2x^2 + 5x - 3)(6x^3 - x^2 + 11x - 7)$

4. Special products

a. The **Square** of a _____

1) $(n + 5)^2 =$

Pattern: $(x + y)^2 =$

Note: This pattern is a shortcut, ONLY use it if you are good at it!

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

3) $(5n + 2p)^2$

b. The **Square** of a _____ **Pattern:** $(a - b)^2 =$

1) $(2n - 4)^2 =$

2) $(3a - 2)^2$

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

c. A **Difference of Two** _____ **(multiplying _____)**

Pattern: $(a + b)(a - b) =$

1) $(n + 3)(n - 3) =$

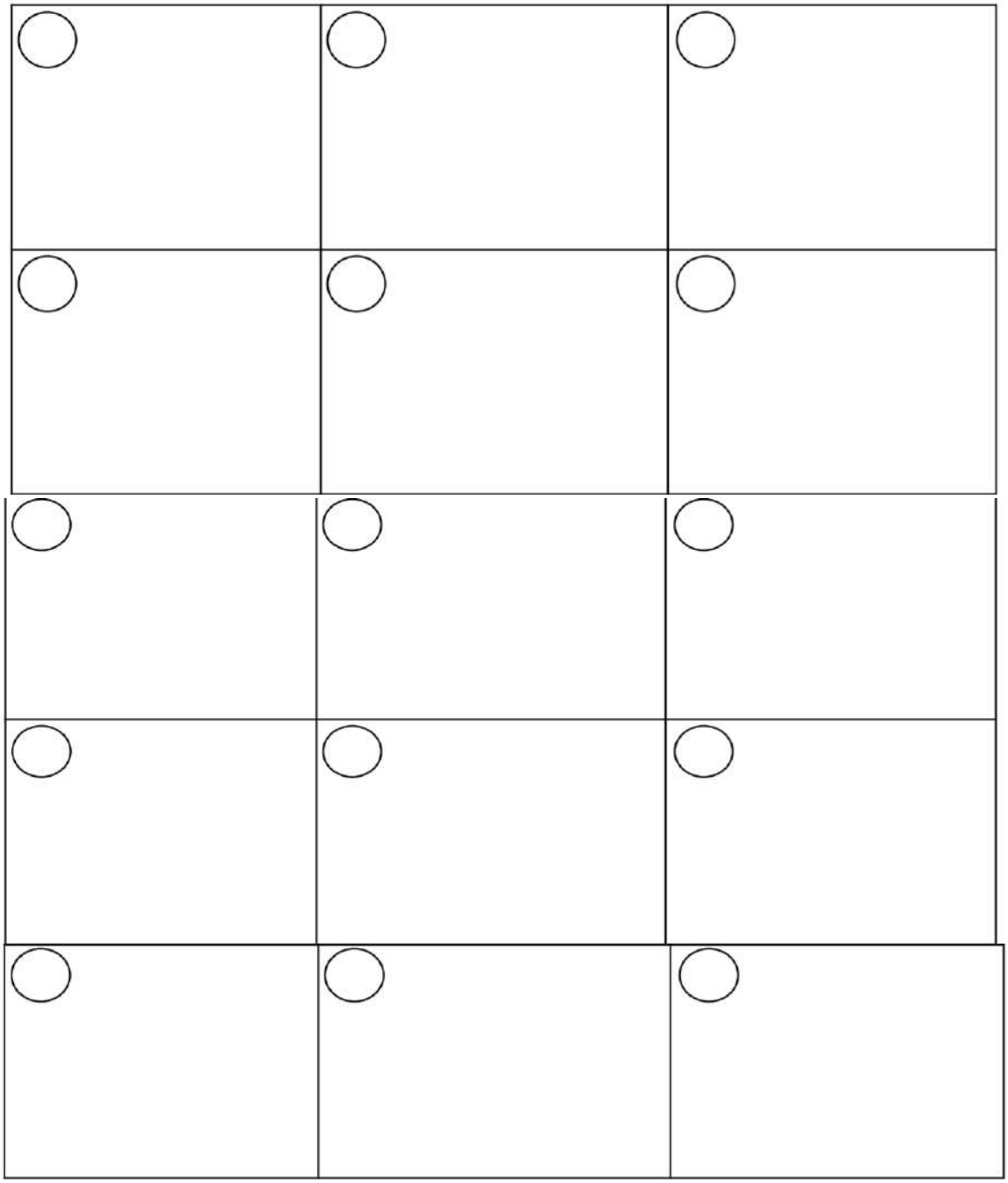
2) $(2x + 4)(2x - 4) =$

3) $(3a + 2b)(3a - 2b) =$

Name: _____ Date: _____ Period: _____

Multiplying Polynomials Scavenger Hunt

Directions: You may start at any card. The answer will lead you to your next question. You should end back where you started. Show all work below. Place the letter of the problem you are working on in the circle.



Previous Answer: $5x^2 + 43x + 24$

A

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

Previous Answer: $8x^2 - 22x + 5$

B

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

Previous Answer: $3x^4 - 9x^3 - x^2 - 9x - 4$

C

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

Previous Answer: $6x^3 - 11x^2 + 23x - 15$

D

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

Previous Answer: $3x^2 - 2x - 8$

E

$$(2x - 5)(4x - 1)$$

Previous Answer: $x^4 + 5x^3 - 10x^2 - 15x + 21$

F

$$-x(4x^2 + 7x - 6)$$

Previous Answer: $2x^5 + 11x^3 + 14x$

G

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

Previous Answer: $2x^3 + 9x^2 + 4x - 15$

H

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

Previous Answer: $x^2 - 11x + 18$

I

$$(x - 3)(7x + 4)$$

Previous Answer: $-4x^3 - 7x^2 + 6x$

J

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

Previous Answer: $7x^2 - 17x - 12$

K

$$(x^2 + 1)(3x^2 - 9x - 4)$$

Previous Answer: $-12x^5 + 18x^2$

L

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

Previous Answer: $2x^3 + 9x^2 - 5x$

m

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

Previous Answer: $5x^4 + 10x^3 - 40x^2$

n

$$(x - 2)(x - 9)$$

Previous Answer: $-8x^4 - 28x^2$

O

$(x^2 - 3)(x^2 + 5x - 7)$