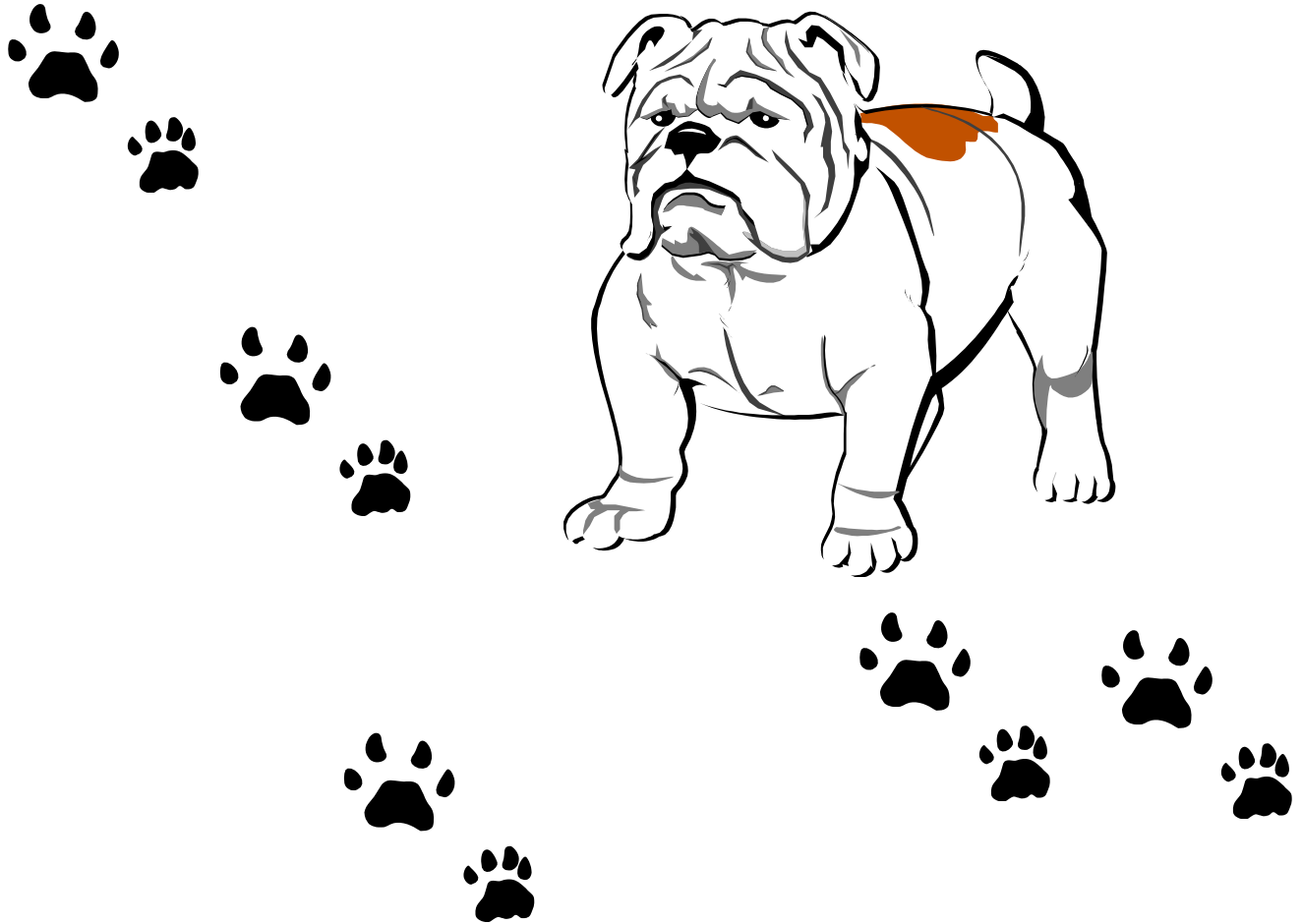


Student Name: \_\_\_\_\_



**Say Hello to Algebra 1**

For Students Entering Algebra 1

This summer math booklet was developed to provide students in middle school an opportunity to review grade level math objectives and to improve math performance.

## Say Hello to Algebra 1

One goal of Baker Middle School is to promote increased math performance at all grade levels. Completing the summer math booklet allows each student and parent within the school to work together to achieve this goal. Students who complete the summer math booklet will be able to:

- Increase retention of math concepts,
- Increase the level of proficiency on the Maryland School Assessment,
- Work toward closing the gap in student performance.

### Student Responsibilities

Students will be able to improve their math performance by:

- Completing the summer math booklet,
- Reviewing math skills throughout the summer.

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Student Signature

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Grade

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Date

### Parent Responsibilities

Parents will be able to promote student success in math by:

- Supporting the math goals of Baker Middle School,
- Monitoring student completion of the summer math booklet,
- Encouraging student use of math concepts in summer activities.

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Parent Signature

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Date

This summer math booklet was adapted by Missy Sigley, Math Resource Teacher at Baker Middle School from the "Sail into Summer with Math!" booklets and from *Introductory Algebra 6<sup>th</sup> Edition* by Keady/Bittinger, published Addison Wesley, 1991.

John T. Baker Middle School

**Distributive Property***Hints/Guide:*

- Multiply (distribute) the number in front of the parenthesis with each of the coefficients (numbers) in the parenthesis.

**Examples:**

$$\begin{aligned} 1. \quad & 3(4 + 2) \\ & = 3 \cdot 4 + 3 \cdot 2 \\ & = 12 + 6 \\ & = 18 \end{aligned}$$

$$\begin{aligned} 2. \quad & 9(x - 5) \\ & = 9 \cdot x - 9 \cdot 5 \\ & = 9x - 45 \end{aligned}$$

$$\begin{aligned} 3. \quad & -4(x - 2y + 3z) \\ & = (-4)(x) + -4(-2y) + (-4)(3z) \\ & = -4x + 8y - 12z \end{aligned}$$

Exercises: Solve the following problems. Show all work.

1.  $2(b + 5)$

2.  $4(x + 3)$

3.  $7(1 + t)$

4.  $4(1 + y)$

5.  $6(5x + 2)$

6.  $9(6m + 7)$

7.  $7(x + 4 + 6y)$

8.  $4(5x + 8 + 3p)$

9.  $7(4 - 3)$

10.  $15(8 - 6)$

11.  $-3(3 - 7)$

12.  $-7(y - 2)$

13.  $-9(y - 7)$

14.  $-9(-5x - 6y + 8)$

15.  $-2.1(-4.2x - 4.3y - 2.2)$

## Equivalent Expressions

Hint/Guide:

***Property of -1***

*For any real number  $a$ :  $-1 \cdot a = -a$ .*

*(Negative one times  $a$  is the opposite of  $a$ .)*

- Change the negative sign in front of the parenthesis to a -1.
- Multiply the negative one (-1) with each term inside the parenthesis.

Examples:

<p>1. <math>-(3 + x)</math>  <math>= -1(3 + x)</math>  <math>= -1(3) + -1(x)</math>  <math>= -3 + (-x)</math>  <math>= -3 - x</math></p>	<p>2. <math>-(3x + 2y + 4)</math>  <math>= -1(3x + 2y + 4)</math>  <math>= -1(3x) + (-1)(2y) + (-1)(4)</math>  <math>= -3x + (-2y) + (-4)</math>  <math>= -3x - 2y - 4</math></p>
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Exercises: Write an equivalent expression by multiplying by negative one. Show all work.

- |                      |                        |                        |
|----------------------|------------------------|------------------------|
| 1. $-(2x + 7)$       | 2. $-(3x + 5)$         | 3. $-(5x - 8)$         |
| 4. $-(6x - 7)$       | 5. $-(4a - 3b + 7c)$   | 6. $-(5x - 2y - 3z)$   |
| 7. $-(6x - 8y + 5)$  | 8. $-(8x + 3y + 9)$    | 9. $-(3x - 5y - 6)$    |
| 10. $-(6a - 4b - 7)$ | 11. $-(-8x - 6y - 43)$ | 12. $-(-2a + 9b - 5c)$ |

## Combine Like Terms

Hint/Guide:

- Combine the coefficients (numbers) of the variables (letters) that are the same.
- Letters (variables) must also have the same exponents.
- Remember to use the sign in front of the coefficients (numbers) to help you complete the operation.

Examples:

$$\begin{aligned} 1. \quad & 4x + 2x \\ & = (4 + 2)x \\ & = 6x \end{aligned}$$

$$\begin{aligned} 2. \quad & \boxed{2x} + 3y \boxed{-5x} - 2y \\ & = (2 - 5)x + (3 - 2)y \\ & = -3x + 1y \end{aligned}$$

$$\begin{aligned} 3. \quad & 2x^2 - 6x + 7x^2 \\ & = (2 + 7)x^2 - 6x \\ & = 9x^2 - 6x \end{aligned}$$

Exercises: Combine terms that are the same. Show all work.

1.  $9a + 10a$

2.  $12x + 2x$

3.  $10a - a$

4.  $-16x + x$

5.  $2x + 9z + 6x$

6.  $3a - 5b + 7a$

7.  $7x + 6y^2 + 9y^2$

8.  $12m^2 + 6q + 9m^2$

9.  $41a + 90 - 60a - 2$

10.  $42x - 6 - 4x + 2$

11.  $23 + 5t + 7y - t - y - 27$

12.  $45 - 90d - 87 - 9d + 3 + 7$

## Solving Two-Step Equations I

### Hint/Guide:

- Undo the number (coefficient) without a letter (variable) by adding or subtracting that number on both sides of the equals.
- Undo the number (coefficient) next to the letter (variable) by multiplying or dividing that number on both sides of the equals.

### Examples:

1. Solve the equation.  
undo by subtracting

$$\begin{array}{r} 3x + 4 = 13 \\ -4 \quad -4 \\ \hline 3x \quad = \quad 9 \\ 3 \quad \quad 3 \end{array}$$

undo by dividing

answer

$$\boxed{x = 3}$$

2. Solve the equation.  
undo by adding

$$\begin{array}{r} -5x - 9 = 16 \\ +9 \quad +9 \\ \hline -5x \quad = \quad 25 \\ -5 \quad -5 \end{array}$$

undo by dividing

answer

$$\boxed{x = -5}$$

Check:  $3x + 4 = 13$   
for  $x = 3$   $3(3) + 4 = 13$   
 $9 + 4 = 13$   
 $13 = 13$

Check:  $-5x - 9 = 16$   
for  $x = -5$   $-5(-5) - 9 = 16$   
 $-25 - 9 = 16$   
 $16 = 16$

Exercises: Solve the two-step equations. Show all work. Check your answers.

1.  $5x + 6 = 31$

2.  $3x + 6 = 30$

3.  $4x - 6 = 34$

4.  $6x - 3 = 15$

5.  $7x + 2 = -54$

6.  $5x + 4 = -41$

7.  $-4x + 7 = 35$

8.  $-7x - 24 = -129$

9.  $-6z - 18 = -132$

## Solving Two-Step Equations II

Hint/Guide:

- Distribute: Multiply the number in front of the parenthesis with each term inside the parenthesis.
- Combine like terms, if needed.
- Undo the number (coefficient) without a letter (variable) by adding or subtracting that number on both sides of the equals.
- Undo the number (coefficient) next to the letter (variable) by multiplying or dividing that number on both sides of the equals.

Example:

Solve the equation.

$$-3(x-2) = -15$$

distribute

$$-3(x) - (-3)(2) = -15$$

undo by subtracting

$$-3x - (-6) = -15 \quad \text{two negatives together}$$

$$-3x + 6 = -15$$

undo by dividing

$$\underline{-6} = \underline{-6}$$

$$\underline{-3x} = \underline{-21}$$

$$\underline{-3} = \underline{-3}$$

answer

$x = 7$
---------

Check:

$$-3(x-2) = -15$$

for  $x = 7$

$$-3(7-2) = -15$$

$$-3(5) = -15$$

$$-15 = -15$$

Exercises: Solve the equations. Show all your work. Check your answers.

1)  $3(2y - 3) = 27$

2)  $4(2y - 3) = 28$

3)  $2(3 + 4m) - 9 = 45$

4)  $3(5 + 3m) - 8 = 88$

5)  $5r - (2r + 8) = 16$

6)  $6b - (3b + 8) = 16$

7)  $6 - 2(3x - 1) = 2$

8)  $10 - 3(2x - 1) = 1$

### Solving Equations with Variables Both Sides

Hint/Guide:

- Combine like terms on both sides, if needed.
- Move all terms with letters (variables) to the left side of the equation by adding or subtracting.
- Move all terms with **just** numbers (constants) to the right side of the equation by adding or subtracting.
- Undo the number (coefficient) next to the letter (variable) by multiplying or dividing that number on both sides of the equals.

Example:

Solve the equation:

combine like terms

move variables to the left

undo by subtracting

undo by dividing

answer

$$\begin{aligned}
 6x + 5 - 7x &= 10 - 4x + 4 \\
 (6x - 7x) + 5 &= (10 + 4) - 4x \\
 -1x + 5 &= 14 - 4x \\
 \underline{+4x} & \qquad \qquad \underline{+4x} \\
 3x + 5 &= 14 \\
 \underline{-5} & \qquad \qquad \underline{-5} \\
 \underline{3x} &= \underline{9} \\
 \underline{3} & \qquad \qquad \underline{3}
 \end{aligned}$$

Check: for  $x = 3$

$$\begin{aligned}
 6(3) + 5 - 7(3) &= 10 - 4(3) + 4 \\
 18 + 5 - 21 &= 10 - 12 + 4 \\
 23 - 21 &= -2 + 4 \\
 2 &= 2
 \end{aligned}$$

$x = 3$

Exercises: Solve the equations. Show all your work. Check your answers.

1)  $2x - 1 = 4 + x$

2)  $5x - 2 = 6 + x$

3)  $5 - 2x = 3x - 7x + 25$

4)  $10 - 3x = 2x - 8x + 40$

5)  $4 + 3x - 6 = 3x + 2 - x$

6)  $5 + 4x - 7 = 4x - 2 - x$

## Solving Equations with Distribution Both Sides

Hint/Guide:

- Distribute: Multiply the number in front of the parenthesis with each term inside the parenthesis on both sides of the equation, if needed.
- Combine like terms on both sides, if needed.
- Move all terms with letters (variables) to the left side of the equation by adding or subtracting.
- Move all terms with **just** numbers (constants) to the right side of the equation by adding or subtracting.
- Undo the number (coefficient) next to the letter (variable) by multiplying or dividing that number on both sides of the equals.

Example:

Solve the equation.	$4x = 2(12 - 2x)$	Check: $4x = 2(12 - 2x)$
distribute	$4x = 2(12) - 2(2x)$	$4(3) = 2(12 - 2 \cdot 3)$
	$4x = 24 - 4x$	$12 = 2(12 - 6)$
move variables to left	$\underline{+4x} = \underline{+4x}$	$12 = 2(6)$
	$\underline{8x} = \underline{24}$	$12 = 12$
undo by dividing	$\frac{8x}{8} = \frac{24}{8}$	
answer	$x = 3$	

Exercises: Solve the equations. Show all your work. Check your answers.

1)  $5(d + 4) = 7(d - 2)$

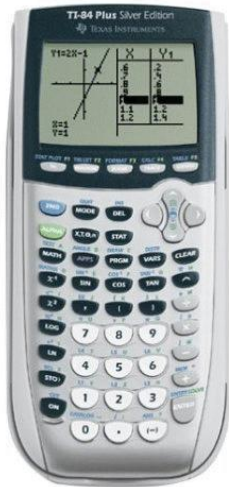
2)  $3(t - 2) = 9(t + 2)$

3)  $8(2t + 1) = 4(7t + 7)$

4)  $7(5x - 2) = 6(6x - 1)$

5)  $3(r - 6) + 2 = 4(r + 2) - 21$

6)  $5(t + 3) + 9 = 3(t - 2) + 6$



# Exploring the Graphing Calculator

1. The key that will turn on the calculator is \_\_\_\_\_.
2. The two keys that are needed to turn the calculator off are \_\_\_\_\_ and \_\_\_\_\_.
3. How do you change the lightness/darkness of the viewing screen?  
 \_\_\_\_\_  
 \_\_\_\_\_
4. What is the difference between the blue - (subtraction) key and the gray - (subtraction) key? Do they look different on the home screen? Explain.  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
5. The key that will let you type a number as an exponent is \_\_\_\_\_.
6. Explain the function of the ALPHA key:  
 \_\_\_\_\_  
 \_\_\_\_\_

7. The key that will display the variable  $x$  without having to use the ALPHA key is \_\_\_\_\_.

8. The \_\_\_\_\_ key is used to access the yellow functions that appear above the gray keys.

9. The \_\_\_\_\_ key is used to enter equations for graphing.

10. The maximum number of equations that can be graphed at one time is \_\_\_\_\_.

11. The \_\_\_\_\_ key is used to display the graph of any function that you have entered with an equation.

12. To use the square root function, you must press the \_\_\_\_\_ and \_\_\_\_\_ keys.

13. Tell three different ways that you can calculate  $78^2$  on the graphing calculator.

\_\_\_\_\_

14. The Home Screen is where you perform calculations. Find two ways to get back to the Home Screen. \_\_\_\_\_

15. The \_\_\_\_\_ key functions as an equal sign.

16. What does the calculator use for  $\pi$ ? \_\_\_\_\_

17. Carry out the following calculations using your graphing calculator:

a.  $3,598 \times 45.76 =$

b.  $68,759,487 \div 29 =$

c.  $(3,956 + 5,493 - 3,401) \div 32 =$

d.  $899^2 + 65^3 =$

e.  $\sqrt{2} =$

f.  $(56 + 195)^2 =$

g.  $-5^2 =$

h.  $(-5)^2 =$

i.  $|53 - 149| =$

j.  $|53| - 149 =$

k.  $8^4 =$

l.  $\frac{8^5}{8^3}$

m.  $(5^6 + 19^5)^2 =$

18. Use the ALPHA key to type your name.
19. Write a short paragraph explaining how you think the graphing calculator will help you this year in Algebra.

# Parent Packet

**Answers to Distributive Property (page 3):**

- 1)  $2b + 10$       2)  $4x + 12$       3)  $7 + 7t$       4)  $4 + 4y$       5)  $30x + 12$
- 6)  $54m + 63$       7)  $7x + 28 + 42y$       8)  $20x + 32 + 12p$       9)  $7$       10)  $30$
- 11)  $12$       12)  $-7y + 14$       13)  $-9y + 63$       14)  $45x + 54y - 72$
- 15)  $8.82x + 9.03y + 4.62$

**Answers to Equivalent Expressions (page 4):**

- 1)  $-2x - 7$       2)  $-3x - 5$       3)  $-5x + 8$       4)  $-6x + 7$
- 5)  $-4a + 3b - 7c$       6)  $-5x + 2y + 3z$       7)  $-6x + 8y - 5$
- 8)  $-8x - 3y - 9$       9)  $-3x + 5y + 6$       10)  $-6a + 4b + 7$
- 11)  $8x + 6y + 43$       12)  $2a - 9b + 5c$

**Answers to Combine Like Terms (page 5):**

- 1)  $19a$       2)  $14x$       3)  $9a$       4)  $-15x$       5)  $8x + 9z$
- 6)  $10a - 5b$       7)  $7x + 15y^2$       8)  $21m^2 + 6q$       9)  $-19a + 88$
- 10)  $38x - 4$       11)  $4t + 6y - 4$       12)  $-92d - 39$

**Answers to Solving Two-Step Equations I (page 6):**

- 1)  $5$       2)  $8$       3)  $10$       4)  $3$       5)  $-8$       6)  $-9$       7)  $-7$
- 8)  $15$       9)  $19$

**Answers to Solving Two-Step Equations II (page 7):**

1) 6      2) 5      3) 6      4) 9      5) 8      6) 8      7) 1

8) 2

**Answers to Solving Equations with Variables Both Sides (page 8):**

1) 5      2) 2      3) 10      4) 10      5) 4      6) 0

**Answers to Solving Equations with Distribution Both Sides (page 9):**1) 17      2) -4      3)  $-5/3$       4) -8      5) -3      6) -12**Exploring the TI-83/84 Graphing Calculator (page 11)**1) ON      2) 2<sup>nd</sup> and ON      3) 2<sup>nd</sup> arrow up  $\Delta$ 

4) The blue - minus key is subtraction. The gray - minus key is a negative sign. The gray key is longer on the home screen.

5)  $\wedge$  (carrot key)      6) the ALPHA key allows you to type letters.      7) XT $\Theta$ N8) 2<sup>nd</sup>      9) y =      10) 10      11) GRAPH      12) 2<sup>nd</sup> and x<sup>2</sup>13) 78 x 78 or 78x<sup>2</sup> or 78 $\wedge$ 2      14) CLEAR or 2<sup>nd</sup> MODE (quit)

15) ENTER      16) pi      17a) 164,644.48      17b) 2,371,016,793

17c) 189      17d) 1,082,826      17e) 1.414213526      17f) 63,001

17g) -25      17h) 25      17i) 96      17j) -96      17k) 4096      17l) 64

17m) 6.208688492 E12