

**Monday, August 20, 2018**

Write each as an algebraic expression.

1) the difference of n and 8  
 $n - 8$

2) the difference of a number and 15  
 $X - 15$

3) 4 cubed  
 $4^3$

4) the product of 9 and x  
 $9 \cdot X$

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**Unit 1 Test Review**

... least to greatest  
 (19)  $\sqrt{5}, \frac{5}{2}, 2.39, 2\frac{2}{3}$   
 Change to decimal  
 $2.23, 2.50, 2.39, 2.66$   
 order:  
 $\sqrt{5}, 2.39, \frac{5}{2}, 2\frac{2}{3}$

Simplify (20)  
 $\sqrt[4]{16x^3y^8}$   
 $4\sqrt[4]{x^3y^8}$   
 $4x^1y^2\sqrt[4]{x}$   
 $\sqrt[4]{16x^3y^8}$   
 $4\sqrt[4]{x^3y^8}$   
 $4xy^2\sqrt[4]{x}$

Aug 20-8:50 AM

Simplify (21)  $\sqrt{15x^2} \cdot \sqrt{5x^3}$   
 $5\sqrt{3x^2x^3}$   
 $5\sqrt{3x^5}$   
 $5x^2\sqrt{3x}$

Simplify... (22)  $\sqrt[3]{190x^7y^9z^4}$   
 $9\sqrt[3]{10x^7y^9z^4}$   
 $9x^2y^3z^4\sqrt[3]{10xy}$

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Foundations of Algebra Unit 2 - Relationships Among Quantities Notes

**Day 2 - Solving Equations and Inequalities**

Remember, an **expression** is a mathematical "phrase" composed of terms, coefficients, and variables that stands for a single number, such as  $3x + 1$  or  $x - 1$ . We use Properties of Operations to simplify algebraic expressions. Expressions do NOT contain equal signs.

An **equation** is a mathematical "sentence" that says two expressions are equal to each other such as  $3x + 1 = 5$ . We use Properties of Equality (inverse operations) to solve algebraic equations. Equations contain equal signs.

When solving equations, you must perform **inverse operations**, which means you have to perform the operation opposite of what you see. You must also remember the operation you perform on one side of the equation must be performed to the other side.

Operation	Inverse Operation
Addition (+)	Subtraction (-)
Subtraction (-)	Addition (+)
Multiplication (x)	Division ( $\div$ )
Division ( $\div$ )	Multiplication (x)

**Practice:** Solve each equation.

1.  $x + 4 = 3$  Operation:  $-$  Inverse Operation:  $+$

2.  $y + 4 = 3$  Operation:  $+$  Inverse Operation:  $-$

3.  $\frac{1}{3} = 9$  Operation:  $\div$  Inverse Operation:  $\times$

4.  $6p = 12$  Operation:  $\times$  Inverse Operation:  $\div$

**Practice:** Solve each equation on your own.

a.  $\frac{3x - 46}{x} = 16$   $x = 7$

b.  $\frac{3}{5} = \frac{m}{5}$   $m = 3$

c.  $\frac{6}{m} = \frac{m}{12}$   $m = 12$

d.  $\frac{7x + 17}{3} = 7$   $x = 7$

e.  $\frac{4y + 9}{3} = 9$   $y = -7$

f.  $\frac{1}{3} = \frac{x}{3}$   $x = 18$

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Foundations of Algebra Unit 2 - Relationships Among Quantities Notes

**Solving Two-Step Equations**

When solving equations with more than one step, you'll want to think about how you can "undo" the operations you see.

**Steps for Solving Two-Step Equations:**

- Identify the variable.
- Add or subtract any constants away from the variable to the other side.
- Multiply or divide to isolate the variable.

**Practice:** Solve each equation, showing all steps, for each variable.

1.  $3x - 2 = 10$   
 $3x = 12$   
 $x = 4$

2.  $2x + 6 = 10$   
 $2x = 4$   
 $x = 2$

3.  $-3y = 22$   
 $-3y = 22$   
 $y = -\frac{22}{3}$

4.  $0.5m = 9$   
 $0.5m = 9$   
 $m = 18$

5.  $\frac{1}{4}x + 5 = 11$   
 $\frac{1}{4}x = 6$   
 $x = 24$

6.  $\frac{10}{4}x = 100$   
 $\frac{10}{4}x = 100$   
 $x = 40$

**Solving Multi-Step Equations**

Multi-step equations mean you might have to add, subtract, multiply, or divide all in one problem to isolate the variable. When solving multi-step equations, you are using inverse operations, which is like doing PEMDAS in reverse order.

**Steps for Solving a Multi-Step Equation:**

- Distribute (if possible)
- Combine like terms on both sides (if possible)
- Add or subtract the variables so they are on only one side of the equation
- Add or subtract the constants to the opposite side of the variables
- Isolate the variable (using multiplication or division)

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**Tuesday, August 21, 2018**

Write each as a verbal expression in two different ways. Do not use plus or minus.

1)  $n - 7$  n less than 7  
n decreased by 7

2)  $n - 3$  n fewer than 3  
n difference of 3

3)  $n + 5$  n greater than 5  
n more than 5

4)  $5 + t$  5 add by t  
5 increased by t

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Foundations of Algebra Unit 2 - Relationships Among Quantities Notes

**Multi-Step Equations with Combining Like Terms**

Practice: Solve each equation, showing all steps, for each variable.

a.  $5n + 6n + 15 = 3n + 9$   $n = 9$

b.  $3x + 12x - 20 = 25$   $x = 3$

c.  $2x + 4x - 12 = 40$   $x = 16$

**Multi-Step Equations with the Distributive Property**

Practice: Solve each equation, showing all steps, for each variable.

a.  $2n + 10 = -2$   $n = -6$

b.  $4(2n - 7) + 3 = 39$   $n = 3$

c.  $4x - 3(4x - 8) = 14$   $x = 4$

**Multi-Step Equations with Variables on Both Sides**

Practice: Solve each equation, showing all steps, for each variable.

a.  $5p - 14 = 8p + 4$   $p = -6$

b.  $12x - 7 = 9x + 2$   $x = 3$

c.  $5x + 34 = 2 + 14x$   $x = 4$

**An Inequality** is a statement that compares two numbers. The quantities being compared use one of the following signs:

$<$	$>$	$\leq$	$\geq$	$\neq$
A is less than B.	A is greater than B.	A is less than or equal to B.	A is greater than or equal to B.	A is not equal to B.

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15)  $7x + 2x = -9$

16)  $-8x - 7x = 15$

17)  $-1 - 6b - 2b = -9$

18)  $6p - 2p = -4$

19)  $-32x - 5(1 + k) = -8$

20)  $88 = 8k + 4$

21)  $124 = -8 + 26 + 8a$

22)  $-111 = -3 + 62a - 2$

23)  $5 + 6a - a - 3 = 4a$

24)  $9 - n = 2n + 1$

25)  $2 - 6a - 5 = 6a + 8$

26)  $5 + 4x = 5 + 10x$

27)  $4(-3 + 3) - 21 = p$

28)  $-6 - 24x = 4 - 24x$

29)  $-16 - 24x = 16 + 6$

30)  $22x = 22$

31)  $x = 1$

1. Write an equation with like terms on the left

2. Write an equation with like terms on different sides of the equals

3. Write an equation that involves only one step to solve

4. Write an equation that involves the distributive property

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Wednesday, August 22, 2018

Solve each equation

1)  $-7 + \frac{7}{6} = -6$

2)  $-8x - 10 = 70$

3)  $3 - 3p = 54$

4)  $6 + \frac{p}{5} = 4$

5)  $9k - 2 = -65$

6)  $-79 = 2 - 9r$

7)  $9k - 2 = -65$

8)  $-79 = 2 - 9r$

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Foundations of Algebra Unit 2 - Relationships Among Quantities Practice

Day 2 - Solving Equations and Inequalities

Solve each equation for the given variable:

1.  $-107 = -56x - 81 + 3$

2.  $-26x + 1 = -112$

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

4.  $-8x - 16 = -8(2x - 4)$

5.  $-65 - 7j + 4(-4 - 5) = 28$

6.  $4(-2n) - 4(n + 1) = 50$

7.  $-28n + 1(-4n + 5) = -2$

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

9.  $\frac{x}{2} = \frac{7}{10}$

10.  $\frac{8}{5}k = 9$

Solve each inequality and graph its solution:

11.  $r - 6 \geq -16$

12.  $x + 7 \geq 4$

13.  $\frac{y}{7} > -10$

14.  $4 - 2x < 8$

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Thursday, August 23, 2018

Solve each equation.

1)  $-6(-5v - 8) - 5v = 177$

2)  $-120 = 8(-7 - k)$

3)  $59 = -(k + 5) - 7(5k - 4)$

4)  $-70 = 2(4r - 7) + 7(r + 7)$

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Quiz Study Guide Date: \_\_\_\_\_ Period: \_\_\_\_\_

Solve each single-step equation.

1)  $\frac{2}{3} = 17 + 4$

2)  $\frac{2}{3} = 17 + 4$

3)  $x = -18$

4)  $14 = 17 + p$

Solve each two-step equation.

5)  $\frac{2}{3} + 6 = 9$

6)  $152 = 5(6 + 8x)$

7)  $80 = 10 + 7n$

8)  $5 = 3 + \frac{1}{4}n$

9)  $-2(1 + 1) = -60$

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10)  $0 = -9 + \frac{x}{2}$   
 $+9 +9$   
 $\frac{x}{2} = 9$   
 $x = 18$

11)  $-25 = 5r + 10$   
 $-10 -10$   
 $-35 = 5r$   
 $-7 = r$

12)  $-9 = -3 + \frac{v}{2}$   
 $2(-9) = 2(-3 + \frac{v}{2})$   
 $-18 = -6 + v$   
 $-12 = v$

13)  $7 = -3n + 7$   
 $-7 -7$   
 $-3n = 0$   
 $n = 0$

14)  $9 = -10 + \frac{v}{8}$   
 $8(9) = 8(-10 + \frac{v}{8})$   
 $72 = -80 + v$   
 $152 = v$

15)  $72 = 9n - 63$   
 $+63 +63$   
 $135 = 9n$   
 $15 = n$

16)  $1 = -10 + x$   
 $+10 +10$   
 $11 = x$

17)  $-9n = -3$   
 $+9n +9n$   
 $-3 = 0$   
 $n = 3$

18)  $-7n - 5 = 100$   
 $+5 +5$   
 $-7n = 105$   
 $-15 = n$

19)  $52 = -2 - 3n$   
 $+2 +2$   
 $54 = -3n$   
 $-18 = n$

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20)  $9 = 2r + 5$   
 $-5 -5$   
 $4 = 2r$   
 $2 = r$

21)  $10 = \frac{x}{5} + 6$   
 $-6 -6$   
 $4 = \frac{x}{5}$   
 $20 = x$

22)  $8(7 + a) = -48$   
 $-8 -8$   
 $7 + a = -6$   
 $-7 -7$   
 $a = -13$

23)  $1 + 7n = 22$   
 $-1 -1$   
 $7n = 21$   
 $3 = n$

24)  $-3(7 + p) = -6$   
 $+3 +3$   
 $-7 + p = 2$   
 $+7 +7$   
 $p = 9$

Solve each multi-step equation.

25)  $6b = 12 + 3b$   
 $-3b -3b$   
 $3b = 12$   
 $3 = b$

26)  $5k - 10 = 7k - 6$   
 $-7k -7k$   
 $-2k - 10 = -6$   
 $+10 +10$   
 $-2k = 4$   
 $2k = -4$   
 $k = -2$

27)  $6(-7p - 4) = -6p + 12$   
 $-42 - 24 = -6p + 12$   
 $-66 = -6p + 12$   
 $-78 = -6p$   
 $13 = p$

28)  $-8k = 2(2k - 6)$   
 $-8k = 4k - 12$   
 $-12k = -12$   
 $1 = k$

29)  $7 = 4r - 8r + 2 = -8(2 + 4r) - 3(1 - 8r)$

30)  $7(2k + 6) = -7(8 + 5k)$

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Friday, August 24, 2018

Solve each equation.

1)  $-14 - 2x = -2(7x - 5)$

2)  $-3(2x + 5) = 38 - x$

Choose 1 or 2  
 choose 3 or 4!

3)  $-7(2x + 8) = -7(x + 1)$

4)  $2(3n + 6) + 6 = 3(3n + 7)$

Quiz

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1.)  $-14 - 2x = -2(7x - 5)$   
 $-14 - 2x = -14x + 10$   
 $+14x +14x$   
 $-14 + 12x = 10$   
 $+14 +14$   
 $12x = 24$   
 $x = 2$

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3)  $-7(2x + 8) = -7(x + 1)$   
 $-14x - 56 = -7x - 7$   
 $+7x +7x$   
 $-7x - 56 = -7$   
 $+56 +56$   
 $-7x = 49$   
 $x = -7$

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Quiz -  
 Equation solving!

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Foundations of Algebra Unit 2 – Relationships Among Quantities Notes

When graphing an inequality on a number line, you must pay attention to the sign of the inequality.

Words	Example	Circle	Number Line
Greater Than	$x > 2$	Open	
Less Than	$p < -3$	Open	
Greater Than or Equal To	$z \geq -2$	Closed	
Less Than or Equal To	$y \leq 0$	Closed	

**Solving and Graphing Linear Inequalities**

A solution to an inequality is any number that makes the inequality true.

Solving linear inequalities is very similar to solving equations, but there is one minor difference. See if you can figure it out below.

**Experiment**  
Take the inequality  $6 > 2$ . Is this true?

- Add 3 to both sides. What is your new inequality?
- Subtract 3 from both sides. What is your new inequality?
- Multiply both sides by 3. What is your new inequality?
- Divide both sides by 3. What is your new inequality?
- Multiply both sides by -3. What is your new inequality?
- Divide both sides by -3. What is your new inequality?

**Conclusion:**

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Foundations of Algebra Unit 2 – Relationships Among Quantities Notes

**Practice:** Solve each inequality and graph.

- $x + 4 < -2$
- $-3x > 12$
- $7 \leq 3x$
- $\frac{x}{2} - 1 \geq 9$
- $-20x + 11 \geq 6$
- $6.6x - 5 \leq 7 + 2x$

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Foundations of Algebra Unit 2 – Relationships Among Quantities Practice

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Day 2 – Solving Equations and Inequalities**

Solve each equation for the given variable:

- $-107 = -5(6x - 8) - 3$
- $-2(6r + 8) = -112$
- $15 - 3k = 5(k - 5) - 3k$
- $-8x - 16 = -8(2x - 6)$
- $-6(5 - 7j) + 4(-4 - 5) = 28$
- $6(1 - 2m) - 4(m - 1) = 50$
- $-2(8n + 1) - 4(n + 5) = -2$
- $-3(-4x - 8) + 2(6 - 6x) = -6x + 2x$
- $\frac{x}{2} = \frac{7}{10}$
- $\frac{8}{6} = \frac{7}{x + 9}$

Solve each inequality and graph its solution:

- $r - 6 \geq -16$
- $x + 7 \geq 4$
- $\frac{y}{7} > -10$
- $4 - 2x < 8$

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Foundations of Algebra Unit 2 – Relationships Among Quantities Inequality Practice

Name: \_\_\_\_\_ ID: 1  
Date: \_\_\_\_\_ Period: \_\_\_\_\_

Solve each inequality and graph its solution.

- $-4 > -2 + n$
- $-8w \leq -160$
- $x - 13 \geq -15$
- $20 > 20w$
- $2x + 1 \leq 29$
- $\frac{x - 3}{7} \geq -2$

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- $-48 \geq 3m - 9$
- $9(-7 + j) > 90$
- $-8p + 1 \geq -31$
- $20 \geq -2(x + 8)$
- $\frac{d + 4}{2} > -3$
- $9 \geq \frac{d}{5} + 9$
- $7(1 + 2a) < -23 + 8a$
- $4(-7 - 2r) - 4(r + 3) < -3r - r$

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