

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
 $9 \cdot X$

Jul 31-4:26 PM

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) $\sqrt[3]{15x^2} \cdot \sqrt[3]{5x^3}$
 $5\sqrt[3]{3x^2x^3}$
 $5\sqrt[3]{3x^5}$
 $5x^2\sqrt[3]{3x}$

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

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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 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 (÷) |
| Division (÷) | 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. $\frac{3}{5} = \frac{m - 8}{c = -5}$ $m = 12$

c. $\frac{1}{3} = \frac{m - 8}{m = -12}$

d. $\frac{1}{3} = \frac{17}{x}$ $x = 18$

e. $\frac{1}{3} = \frac{17}{x}$ $x = 18$

f. $\frac{1}{3} = \frac{17}{x}$ $x = 18$

Aug 15-10:31 AM

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. $-3y = 22$
 $-3y = 15$
 $y = -5$

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 Combined Like Terms

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

a. $5n + 6n + 15 = 3n + 9$ b. $3x + 12x - 20 = 25$ c. $2x + 4x - 12 = 40$

$-2x + 18 = -3$ $15x - 20 = 25$ $2x - 12 = 40$
 $-15 = -15$ $+20 \quad +20$ $+12 \quad +12$
 $-30 = -18$ $15x = 45$ $2x = 52$
 $-2 = -2$ $x = 3$ $x = 26$
 $n = 9$

Multi-Step Equations with Like Denominators

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

a. $2n + 10 = -2$ b. $4x - 20 = 14$ c. $4x - 20 = 14$

$-10 = -10$ $4x - 20 = 14$ $4x - 20 = 14$
 $2n = -12$ $+20 \quad +20$ $+20 \quad +20$
 $n = -6$ $4x = 34$ $4x = 34$
 $x = 8.5$ $x = 8.5$

Multi-Step Equations with Variables on Both Sides

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

a. $5x + 34 = 2 + 14x$ b. $5x + 34 = 2 + 14x$

$-5x = -32$ $5x + 34 = 2 + 14x$ $5x + 34 = 2 + 14x$
 $-30 = -30$ $-14x = -32$ $-14x = -32$
 $-5 = -5$ $14x = 32$ $14x = 32$
 $p = -6$ $x = 2.29$ $x = 2.29$

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) $-1 - 6x - 20 = -9$ 18) $6p - 2p = -4$

$+1 - 1$ $-4p = -4$
 $-k - 8b = -9$ $+1$ $p = -1$
 $-8b = -8$ $b = 1$

19) $-32x - 51 = 8x$ 20) $88 = 8x + 4$

$-88 = -88$ $80 = 8x$
 $x = 10$

21) $124 = -8 + 26 + 8x$ 22) $-111 = -3 + 62n - 2$

$124 = 18 + 8x$ $-111 = 59 + 62n$
 $106 = 8x$ $-170 = 62n$
 $x = 13.25$ $n = -2.74$

23) $5 + 6x - 3 = 4x$ 24) $9 - n = 2 + n$

$2 = 4x - 6x$ $-n - n = 2 - 9$
 $2 = -2x$ $-2n = -7$
 $x = -1$ $n = 3.5$

25) $5 + 4x = 5 + 6x + 8$ 26) $10 - 5x = 2 + 10x + 2$

$5 + 4x = 5 + 6x + 8$ $10 - 5x = 2 + 10x + 2$
 $-2x = 10$ $-10 = 12x$
 $x = -5$ $x = -0.83$

27) $4x + 31 = 21 + p$ 28) $-6 - 24x = 4 - 24x$

$4x + 31 = 21 + p$ $-6 - 24x = 4 - 24x$
 $4x + 31 = 21 + p$ $-10 = 0$
 $4x = -10 + p$ $x = 0$

29) $-9p + 24 = -21 + 8$ 30) $-16 - 24x = 16 + 6$

$-9p + 24 = -21 + 8$ $-16 - 24x = 16 + 6$
 $-9p + 24 = -13$ $-22 = 24x$
 $-9p = -37$ $x = -0.92$

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) $-8x - 10 = 70$

$+\frac{7}{6} \quad +\frac{7}{6}$ $-10 = 70$
 $-\frac{7}{6} + \frac{7}{6} = -6 + \frac{7}{6}$ $-8x = 80$
 $0 = -\frac{5}{6}$ $-8x = 80$
 $n = 6$ $-8x = 80$
 $x = -10$

3) $3 - 3p = 54$ 4) $6 + \frac{p}{5} = 4$

$-3p = 51$ $\frac{p}{5} = -2$
 $-3p = 51$ $p = -10$
 $p = -17$

5) $9k - 2 = -65$ 6) $-79 = 2 - 9r$

$-2 = -65$ $-79 = 2 - 9r$
 $9k = -63$ $-81 = -9r$
 $k = -7$ $9 = r$

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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:

1. $-107 = -56x - 81 + 3$ 2. $-26x + 1 = -112$

3. $15 - 3k = 5k - 5 - 3k$ 4. $-8x - 16 = -8(2x - 4)$

5. $-65 - 7j + 4i - 4r - 5 = 28$ 6. $4(1 - 2m) - 4m + 1 = 50$

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

Distribute $-120 = 8(-7 - k)$
 Like terms $-120 = -56 - 8k$
 $48v + 48 - 5v = 177$ $-20 = -8k$
 $43v + 48 = 177$ $+56 \quad +56$
 $43v = 129$ $-64 = -8k$
 $v = 3$ $-8 = -8k$
 $k = 8$

3) $59 = -(k + 5) - 7(5k - 4)$ 4) $-70 = 2(4r - 7) + 7(r + 7)$

$59 = -k - 5 - 35k + 28$ $-70 = 8r - 14 + 7r + 49$
 $59 = -36k - 5 + 28$ $-70 = 15r + 35$
 $59 = -36k - 3$ $-35 = 15r$
 $-36k = 62$ $-105 = 15r$
 $k = -1.72$ $r = -7$

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Foundations of Algebra Unit 2 - Relationships Among Quantities Practice

Name: _____ ID: 1

Quiz Study Guide Date: _____ Period: _____

Solve each single-step equation.

1) $\frac{2}{3} = 17 + 4$ 2) $-72 = -4x$

$x = 68$ $-9x = 288$
 $x = 18$

3) $x = -17 + 17$ 4) $14 = 4 + p$

$x = -18$ $10 = p$

Solve each two-step equation.

5) $\frac{2}{3} + 6 = 9$ 6) $152 = 6(12 + x)$

$5(\frac{2}{3}) = (3)5$ $152 = 72 + 6x$
 $r = 15$ $-56 = 6x$
 $9x = -56$
 $x = -6.22$

7) $80 = 10 + 7n$ 8) $5 = 3 + \frac{1}{2}n$

$-10 = 7n$ $2 = \frac{1}{2}n$
 $70 = 7n$ $n = 4$

9) $-2(1 + 1) = -60$ 10) $-6x + 6 = 54$

$-4 = -60$ $-6x = 48$
 $x = 8$ $x = -8$

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

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

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

17) $-9n = -3$
 $\div -9 \div -9$
 $n = \frac{1}{3}$

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

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

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

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

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

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

24) $-3(7 + p) = -6$
 $\div -3 \div -3$
 $7 + p = 2$
 $-7 -7$
 $p = -5$

Solve each multi-step equation.

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

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

27) $6(-7p - 4) = -6p + 12$
 $\div 6 \div 6$
 $-7p - 4 = -p + 2$
 $+p +p$
 $-6p - 4 = 2$
 $+4 +4$
 $-6p = 6$
 $\div -6 \div -6$
 $p = -1$

28) $-8(2 + 6) = -7(8 + 5)$
 $-8(8) = -7(13)$
 $-64 = -91$

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

30) $7(2x + 6) = -7(8 + 5)$
 $\div 7 \div 7$
 $2x + 6 = -8 - 5$
 $2x + 6 = -13$
 $-6 -6$
 $2x = -19$
 $-9.5 = x$

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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

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

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

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Quiz -
 Equation solving!

Aug 21-7:53 AM

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 Practice

Name: _____ ID: 1
Date: _____ Period: _____

Inequality Practice

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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