Unit 4: Equations & Inequalities

Notes

<u>Unit 4: Equations & Inequalities</u> Learning Goal 4.1 – Solving Equations

After completion of this unit, you will be able to...

Learning Target #1: Creating and Solving Linear Equations

- Solve one, two, and multi-step equations (variables on both sides)
- Justify the steps for solving a linear equation
- Create and solve an equation from a context
- Solve a literal equation (multiple variables) for a specified variable
- Use a Formula to Solve Problems

Monday	Tuesday	Wednesday	Thursday	Friday
		2 nd	3 rd	4 th
		Day 1	Day 2	Day 3
		Solving 1 & 2 Step	Multi-Step	Multi-Step
		EquationS	Equations	Equations,
				Properties of
				Equality
7 th	8 th	9 th	10 th	11 th
Day 4	Day 5	Day 6	EARLY RELEASE	Day 7
Solving Literal	Solving Literal	Creating & Solving	(1st and 2nd)	Creating Equations
Equations	Equations	Equations from a	Practice Day	from a Context
		Context		
14 th	15 th	16 th	17 th	18 th
Day 9	Day 9	PSAT DAY	Day 10	Day 11
4.1 Assessment,	Solving 1 and 2	(3 rd and 4 th)	Solving MultiStep	Creating
Day 8 - Graphing	Step Inequalities	Practice Day	Inequalities	Inequalities from a
Inequalities				Context
21 st	22 nd	23 rd	24 th	25 th
Day 12	4.2 Assessment			
Creating				
Inequalities from a				
Context				

	Monday	Tuesday	Wednesday	Thursday	Friday
AM	NONE	Mrs. Jackson 7:45 – 8:15 Room 1210	Mr. Webb 7:45 – 8:15 Room 1205	Mr. Watson 7:45 – 8:15 Room 1208	Mr. Watson 7:45 – 8:15 Room 1208
PM	Mrs. Petersen 3:30 – 4:30 Room 1210	Mr. Webb 3:30 – 4:30 Room 1205	NONE	Mrs. Jackson 3:30 – 4:30 Room 1210	NONE

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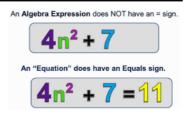
Unit 4: Equations & Inequalities

Notes

Day 1 - Solving One & Two Step Equations

Remember, an expression is a mathematical "phrase" composed of terms, coefficients, and variables that stands for a single number, such as 3x + 1 or $x^2 - 1$. We use Properties of Operations to <u>simplify</u> 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



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.

Informal		Formal			
Operation	Inverse	Property	General Example	Example 1	
Addition	subtract	Addition Property of Equality	If a = b, then a + c = b + c	If x - 4 = 8, then x = 12	
Subtraction	addition	Subtraction Property of Equality	If a = b, then a - c = b - c	If x + 5 = 7, then x = 2	
Multiplication	division	Multiplication Property of Equality	If a = b, then ac = bc	If $\frac{x}{2} = 9$, then $x = 18$	
Division	multiply	Division Property of Equality	If $a = b$, then $\frac{a}{c} = \frac{b}{c}$	If $2x = 10$, then $x = 5$	

No More "Cancelling"

When you first learned to solve equations in middle school, you might have used the words "cancel". We are no longer going to use the word "cancel". Take a look at the following examples: $\times = 1 \times$

$$x - 120 = 80$$

 $+120 + 120$
 $x + 0 = 200$
 $\times = 200$
Additive inverse Adding to zero

$$\frac{k}{2} \times \frac{1}{2} = 16 \times 2$$

32 = 16 V

Multiplicative Inverse Divides/Multiplies to one

Additive Inverse	A number plus its inverse equals 0.	a + -a = 0	7 + -7 = 0
Multiplicative Inverse (Reciprocal)	A number times its reciprocal equals 1.	$a \cdot \frac{1}{a} = 1$	3 · ½= 1

Unit 4: Equations & Inequalities

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Solving One Step Equations Practice

Practice: Solve each equation.

1.
$$\frac{x-4=3}{4+4+4}$$

$$x+\delta=7$$

Operation You See: Subtract

Inverse Operation: addition

2.
$$y + y = 3$$

Operation You See: _addition

Inverse Operation: Subtract

$$y = -1$$
3. $3 \cdot \frac{s}{s} = 9 \cdot 3$

Operation You See: avision

Inverse Operation: Multiply

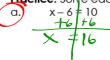
4.
$$\frac{6p = 12}{6}$$

4.
$$\frac{6p = 12}{6}$$
 Operation You See: multiplication Inverse Operation: divide

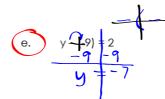
$$P = \frac{12}{6}$$
 $6(2) = 12$



Practice: Solve each equation on your own.



d.
$$\frac{X}{7} = 1$$



d = -5

f.
$$\frac{3}{1} \cdot \frac{1}{3}x = 6 \cdot \frac{3}{1}$$

$$X = 6 \cdot \frac{3}{1}$$

$$X = 18$$

Solving Two Step Equations

When solving equations with more than one step, you still want to think about how you can "undo" the operations you see. For the following equations, describe the operations being performed on each variable (go in PEMDAS order). Then describe the inverses using a table.

$$\frac{a.3x + 8 = 14}{\cancel{3}} = \frac{9}{3}$$

$$\cancel{x} = \cancel{3}$$

$$\frac{b.2n - 6 = 4}{210} = 10$$

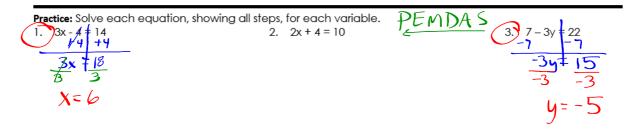
$$h = 5$$

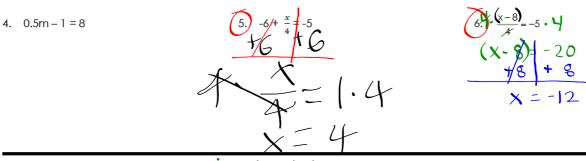
$$\frac{4}{\sqrt{1}} \cdot \frac{1}{2} \cdot \frac{1}{\sqrt{4}} = 1 \cdot 4$$

$$\frac{1}{\sqrt{1}} \cdot \frac{1}{\sqrt{4}} = 1 \cdot 4$$

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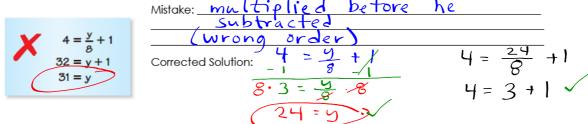
Notes





Error Analysis with Solving Equations

1. William solved the following equation on his homework last night. However, he solved it incorrectly. Describe the mistake William made and what he should have done instead. Then re-solve the equation to find the correct answer.



2. Tyler solved the following equation on his homework last night. However, he solved it incorrectly. Describe the mistake Tyler made and what he should have done instead. Then re-solve the equation to find the correct answer.



