Title: A Balancing Act: Solving Multi–Step Equations

Brief Overview:

Students will be able to solve multi–step equations, including the concepts of distributive property and combining like terms. At the beginning of the unit, students will review the distributive property and identifying like terms. Throughout the unit students will be using manipulatives and cooperative learning strategies in order to enhance their understanding of solving multi–step equations.

NCTM Content Standard/National Science Education Standard:

Standard 1.0 Knowledge of Algebra, Patterns, and Functions
B. Expressions, Equations, and Inequalities

Grade/Level:

Grades 6 – 8, Pre–Algebra

Duration/Length:

Three 86–minute classes

Student Outcomes:

Students will be able to:

- Identify, write, and solve one–step or two–step equations
- Write equations and inequalities to represent relationships
- Determine the unknown in a linear equation

Materials and Resources:

- Dry–Erase Boards with markers
- Algebra Tiles
- Poster Paper
- Copies of Worksheets:
    - PEMDAS! Warm-up activity
    - Match This
    - Tiling Equations
    - Scavenger Hunt
    - Solving Two Step Equations Exit Ticket
    - Solving Multi-Step Equations Warm–Up
    - Solving Multi–Step Equations Note–taking Guide
    - Solving Equations Practice Problems
    - Solving Multi–Step Equations Partner Pass

- Solving Multistep Equations BCR
- Another Day of Solving Equations Warm Up
- Seek and Find

Lesson 1:

Pre–assessment – Students will start the day with the warm–up, "PEMDAS!", a review of the order of operations. There will be four expressions where students will be required to simplify using the correct order of operations without calculators.

Launch – Before starting the new concept, review the concepts of combining like terms and the distributive property. These are hard concepts for the students to master, and the new material will be mastered much quicker by reviewing all the needed concepts first.

Review: Play the "Match This!" memory game to review the distributive property and combining like terms. Divide the class into groups of four, and then instruct students to partner up within that group. Taking turns, pairs turn over cards looking for a match between expressions and the simplified solutions. If they match two cards, they get another turn. Students with the most matches at the end win the game! It is suggested that the teacher offer prizes to the winners as a small incentive.

Teacher Facilitation – Review a one–step equation using Algebraic Tiles and have the students use dry–erase boards to show step–by–step how to solve the problem. Walk around and make sure that students are lining the problem up in a linear format.

Example:

$$\frac{2x}{2} = \frac{8}{2} \quad \text{Divide each side by 2}$$

$$x = 4$$

Once students have work and descriptions shown, tell the students that they will now be moving onto solving two–step equations the exact same way.
Using algebra tiles, demonstrate how to solve two step equations. The students should use either their own set of pre–made algebra tiles, or use a class set. Distribute copies of "Tiling Equations" to work through examples with students. Refer to the Teacher Resource sheet for an example on how to use the tiles to solve the equations. More than three examples may be necessary for students to master the concept.

Examples (as they appear on the "Tiling Equations" worksheet):

- $2x - 8 = 2$ (answer: $x = 5$)
- $2x - 4 = 4$ (answer: $x = 4$)
- $3 + 3x = 12$ (answer: $x = 3$)

Once students seem to understand how to solve the problems with the tiles, the teacher should show how to solve the same problems on paper using symbolic manipulation.

After the students show mastery of the concept, put up a problem or two for the students to work on their own.

Example:

- $4x + 3 = 15$ (answer: $x = 3$)
- $\frac{x}{3} - 4 = 2$ (answer: $x = 18$)

Student Application – Students will play a "Scavenger Hunt" where they must solve one– and two–step equations. How this works is that each problems answer leads the students to the next problem until the students are back to their first problem. By having students start at random points, you are making sure that there is not congestion around one problem. It also helps to make sure that students are not copying off of others. Students should pair up (or the teacher can pick the partners) and have something hard, such as a clip board, to write on. If the teacher wants, she can fold the paper down to cover the answer and write a letter on the now blank side. This makes it so that once the students have the questions answered in the correct order; they have spelled out a secret message! (Examples: Spring into Math; Einstein; Pythagorean; Math is fun) Refer to the "Scavenger Hunt" Teacher Resource Sheet for more explanation on how to set up the activity. Note that eight scavenger hunt cards have been created for use, but more may need to be created due to the size of the class. Avoid equations that repeat answers; each answer must be unique for the loop to work.

Embedded Assessment –The informal assessments should be happening throughout the lesson as the teacher observes the students in the Scavenger Hunt. For a formal assessment,

Answer (3 pts)

$$\frac{1}{2}x + 7 = 15$$
$$\quad -7 \quad -7$$

$$\frac{2}{1} \times \frac{1}{2}x = 8 \times \frac{2}{1} \longrightarrow \cancel{\frac{2}{1} \times \frac{1}{2}}x \qquad 8 \times 2$$

$$x = 16$$

Reteaching/Extension – Students who need to be re–taught will be asked to stay for tutoring during the week. The extension is worked into the lessons in the following two days.

Lesson 2:

Preassessment – Students will review the concepts from the previous day with the "Solving Multi-Step Equations Warm–Up" activity. Make an overhead of the Warm–Up as well as the answer key so that students can quickly assess their own understanding.

Launch – Make this an overhead or handout for the students to be able to read it to themselves while you read it aloud. *Quarter Quandary:* Tell students that you started the day with some quarters. After going to the bank, you had twice as many quarters. Then you found 3 more quarter in your couch cushion and had a total of $4.25 worth of quarters. Ask students how working backward can be used to find how many quarters you had at the beginning.

Teacher Facilitation – The teacher will guide the class in solving multi–step equations which incorporate distributive property and combining like terms, by leading them through the " Solving Multi–Step Equations Note–taking Guide".

Student Application – Students will work with a partner to solve "Solving Multi–Step Equations Partner Pass". Person A will complete the first step, then pass the paper to Person B who will check the first step and complete the second step, and so on. Students must show all of the steps to the problem.

Embedded Assessment – In order to determine the student's progress, the teacher will have each individual complete the "Solving Multistep Equations BCR" for an Exit Ticket in a Brief Constructed Response format.

Reteaching/Extension

- Reteaching: Encourage students to use the acronym SADMP, which stands for *Simple As Doing Math Problems* and indicates that subtraction and addition are undone first, then division and multiplication, and finally operations within parentheses when solving multi–step equations.
- Extension: Solve the *Nickel Conundrum*. Tell students that you started the day with some nickels. After going to the bank, you had four times as many nickels. Then you found 3 more nickels in your pocket, but lost 30 cents worth of nickels while skipping over a puddle. You ended the day with $4.25 worth of nickels. How many nickels do you have at the beginning?

Lesson 3

Pre–assessment – Students will start the day with a warm–up on solving two–step equations (see Day 3 Warm–Up).

Launch – This is the time to get the students into thinking of the variable as units. The teacher should discuss with the students that *x* could stand for an unknown amount of minutes, *y* could be an unknown amount of pies, *b* could be an unknown amount of people.

Teacher Facilitation – Show a two–step equation in word format and show the students how you would translate it into an equation. Show the students that the variable can be any letter and that variables always represent an unknown quantity. After talking about the problem for a few minutes, the teacher should put up an algebraic two–step equation. The teacher should then write a problem or story to go with the problem. The teacher and class should create about 5 problems together.

Example:
$3x + 2 = 8$ (more examples attached)

I want *x* to represent chores.

Sam is always allowed to have two cookies for lunch. Sam's mom told Sam that for every chore he completed, he would get 3 more cookies. How many chores does Sam have to complete in order to receive eight cookies?

Student Application – Students should choose groups of 3 or 4 (or the teacher can choose the groups). Each group is given an equation, and then they must create a story to go with the equation. Students should write the story on a piece of posterboard with the equation on the other side (make sure the ink doesn't bleed through!). The teacher needs to make sure that the groups aren't sharing their work with other groups! When all groups are done, groups will present their problem to the class. As the group is presenting, the other groups are trying to translate it. When all students think they have the equation, they will display it using dry erase response boards. Then, the group should turn the poster over to show the class the correct equation. Using the correct equation, students should solve the equation on the dry erase boards.

Embedded Assessment – This is checking to see if students understand that equations represent problems, but also if students can solve the translated equation. Teachers should collect posters and the papers with the equations solved at the end of class.

Re–teach/Extension – Students who need to be re–taught will be asked to stay for tutoring during the week. The extension is a worksheet on creating equations.

Summative Assessment:

Students will ultimately be tested on this material during the MSA. Teachers will be testing through exit tickets, quizzes, and chapter tests.

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PEMDAS! Name: _____

Warm – Up Activity

Simplify each expression. Be sure to follow the order of operations (P.E.M.D.A.S.)

1) $(2+3)^2 + 3^3 \times 4$

2) $\frac{1}{2}(8+2) \div 5$

3) $(2+8\times 4-2) \div 4^2$

4) $(12 \div 6 + 2 - 8) \times 5$

CHALLENGE: Solve for *x*:

$$2x + 4 = 8$$

PEMDAS! Name: ___**ANSWER KEY**_____

Warm – Up Activity

Simplify each expression. Be sure to follow the order of operations (P.E.M.D.A.S.)

1) $(2+3)^2 + 3^3 \times 4$

133

2) $\frac{1}{2}(8+2) \div 5$

1

3) $(2+8\times 4-2) \div 4^2$

2

4) $(12 \div 6 + 2 - 8) \times 5$

–20

CHALLENGE: Solve for *x*:

$$2x + 4 = 8$$

$$x = 1$$

Match This!

$3(x+2)$	$3x+6$
$(2x)^2$	$4x^2$
$4-2(x-3)$	$-2x+10$
$3x+4y-2x+6y$	$x+10y$
$(2x+4)3-8(x+2)$	$-2x-4$

$-(x+2)+3(4+x)$	$2x+10$
$4(5x)+6\div 2-10x+1$	$10x+4$
$6+(-2)+(-8)$	-4
$12x+(-5x)+3x$	$10x$
$2x+6(x-7)$	$8x-42$

Tiling Equations

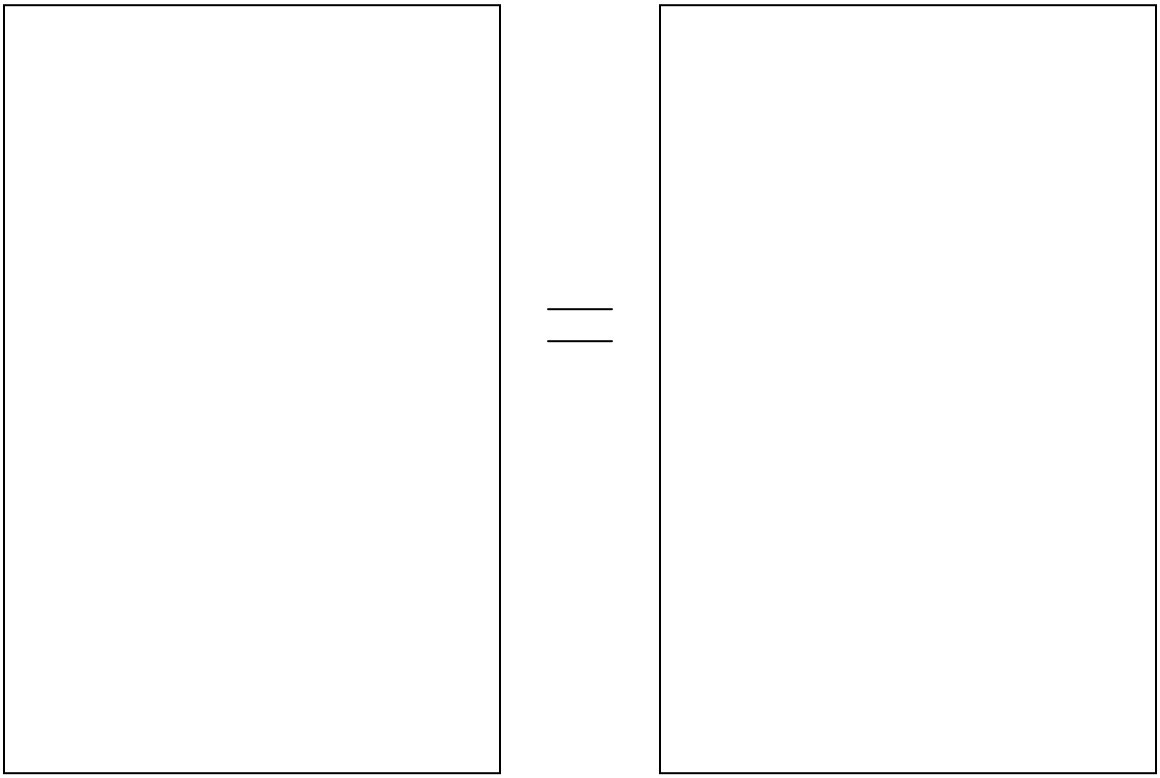
Solving Two–Step Equations Using Algebra Tiles

Example 1: $2x - 8 = 2$

Example 2: $2x - 4 = 4$

Example 3: $3 + 3x = 12$

Algebra Tiles Equation Placemat:

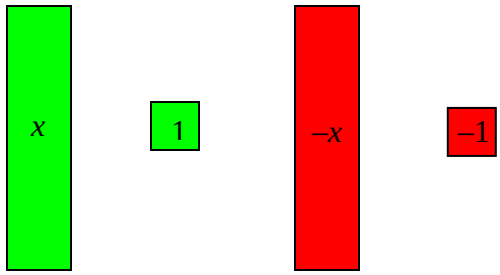


Tiling Equations

Solving Two–Step Equations Using Algebra Tiles

Teacher Resource Key

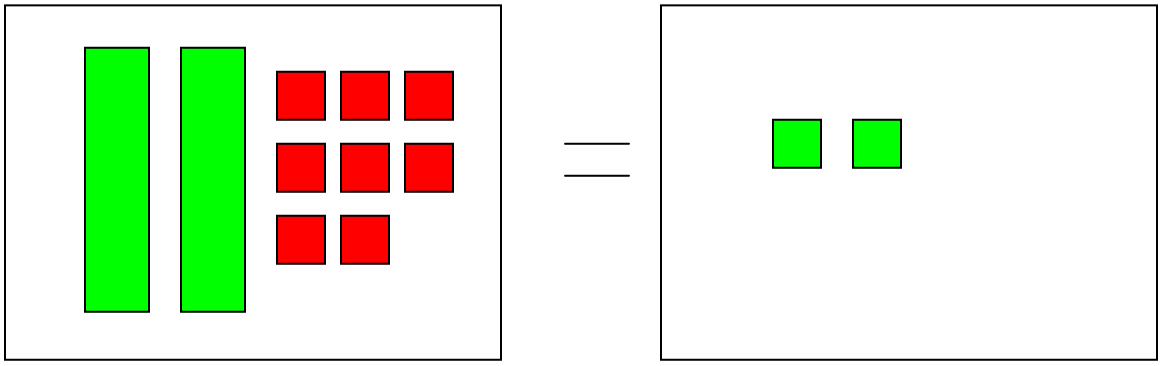
Basic Algebra Tiles:



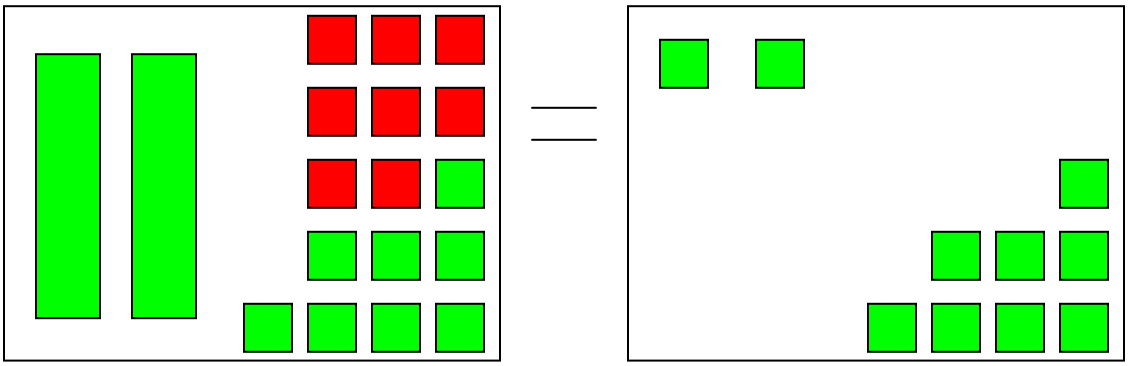
Using Algebra Tiles to Solve Equations:

Example 1: $2x - 8 = 2$

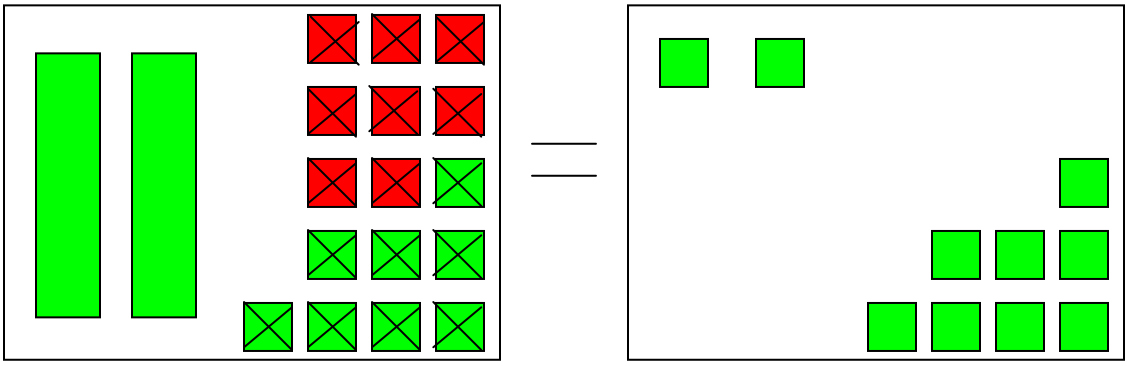
<u>Step 1</u>: Use the tiles to represent the equation.



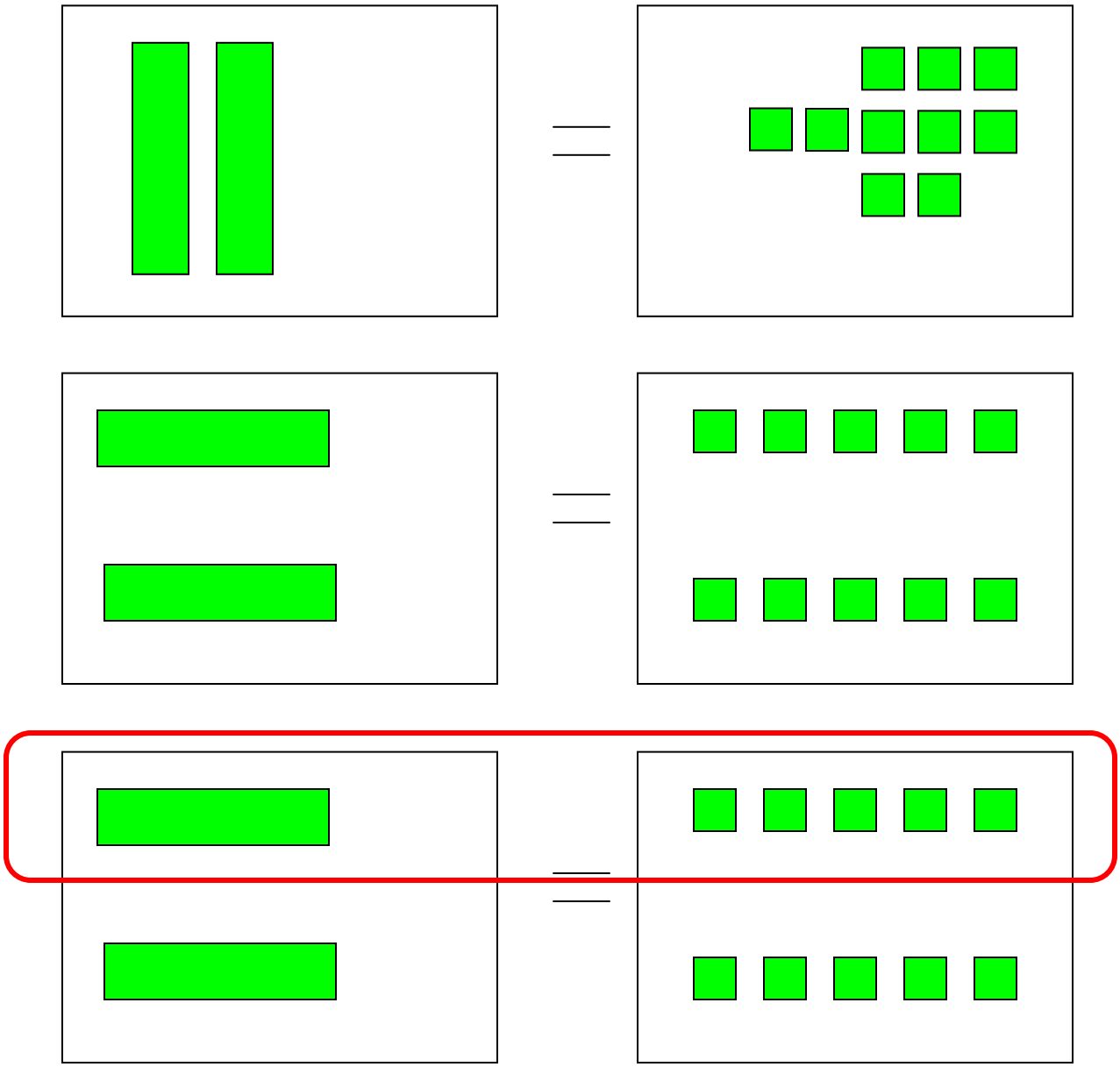
Step 2: You need to get *x* by itself, so you must "zero out" the (–8). To do this, you must add 8 to both sides of the equation. When the same amount is added to both sides of the equation, the equality remains. However, adding 8 to the left side of the equation "zeros out" the (–8) on the left side.



Step 3: You can now cancel out the negatives on either side!



Step 4: You now need to figure out how much one x is equal to. Divide the right side evenly between the two on the left side.



So…each x is equal to 5. So, $x = 5$.

Scavenger Hunt

There are two ways to do this!

Method 1:
This is where the answer leads to the next problem and there is NO hidden message!

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

Method 2:
This is where the answer leads to the next problem and there IS a hidden message! (ABC in this example)

View 1	View 2	View 1	View 2
$2x = 8$	A	$x - 6 = 2$	B
$x = 5$	$x = 5$	$x = 4$	$x = 4$

Folded down!

Folded down!

$$x/3 = -7$$

$$x = 7$$

$$x + 30 = -1$$

$$x = -21$$

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

$$x = -31$$

$$9x = 6(3 + 4) + 3$$

$$x = 1$$

$$(3/4)x = 6$$

$$x = 5$$

$$-x + 4 = 9$$

$$x = 8$$

$$4^2 - (x+3) = 16$$

$$x = -5$$

$$3x + 1 = 19$$

$$x = -3$$

Solving Two Step Equations Name: _____
Exit Ticket

Solve for *x*. (3 points: show all work!)

$$\frac{1}{2}x + 7 = 15$$

Solving Two Step Equations Name: _____
Exit Ticket

Solve for *x*. (3 points: show all work!)

$$\frac{1}{2}x + 7 = 15$$

Solving Multi-Step Equations
Warm–Up

Simplify the following expressions.

1) $-5(3n+8)$

2) $12(-2a-6)$

For questions 3 and 4,

- ✓ **Identify the like terms in the following expressions by drawing different shapes around each set of like terms.**
- ✓ **Combine the like terms.**

3) $9h-16-16h+8$

4) $-7+4a-5b+23-9b+13a$

Solving Multi-Step Equations
Warm–Up

Check your answers!

Simplify the following expressions.

1) $-5(3n+8)$

$-15n-40$

2) $12(-2a-6)$

$-24a-72$

For questions 3 and 4,

- ✓ **Identify the like terms in the following expressions by drawing different shapes around each set of like terms.**
- ✓ **Combine the like terms.**

3) $9h-16-16h+8$

$-7h-8$

4) $-7+4a-5b+23-9b+13a$

$16+17a-14b$

Solving Multi–Step Equations
Note–taking Guide

Name _____
Date _____

Laughing All the Way to the Bank! Create an equation to solve the *Quarter Quandary*. Let *q* represent the number of quarters.

*Determine that ___ quarters equal $4.25

Step 1: Combine your _____terms.
Step 2: _____ to undo the addition.

Step 3: _____ to undo the multiplication.

You had ____ quarters at the beginning.

How can you check to determine if your solution is correct?

Solve each equation. Check your solution.

<u>Ex. 1</u> $28-4(r-5)=-4$

Check:

Your Turn: $100+12(a-8)=-68$

Check:

Ex. 2 $21-\frac{1}{3}x+19=35$

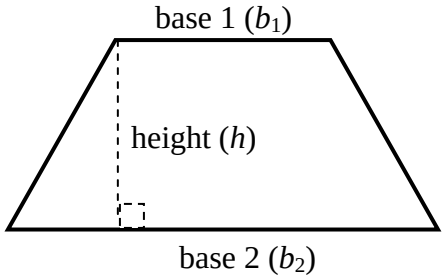
Check:

Your Turn: $-64+\frac{2}{5}x-11=-79$

Check:

Ex. 3 The area, A, of a trapezoid can be found by multiplying the height h and one–half the sum of the lengths of the bases b_1 and b_2. The formula is $A=\frac{1}{2}h(b_1+b_2)$.

The area of the trapezoid at the right is 84 square inches. The trapezoid is 8 inches high, and the length of one of the bases is 9 inches. What is the length of the other base?



Your Turn: Use the formula for the area of the trapezoid to find the length of the other base of a trapezoid with one base 8.3 centimeters long, a height of 3.6 centimeters, and an area of 24.12 square centimeters. Draw a picture of the trapezoid labeling its dimensions.

Steps to solving Multi-Step Equations

1. Simplify the equation. Simplify by _____ like terms and/or using the _____ property if needed.

2. Undo _____ and/or _____ by performing its inverse operation on both sides of the equation.

3. Undo _____ and/or _____ by performing its inverse operation on both sides of the equation.

Solving Equations
Practice Problems

Name: _____
Date: _____

Solve each equation. Check your solution.

1. $-58-5(7y+9)=-278$	2. $-2.5(a+2a)=22.5$
3. $\frac{1}{5}(25-15x)+16=30$	4. Sarah mailed some photographs to her friend Jamal. She paid $1.65 to send them first class. The Post Office charges 39 cents for the first ounce and 21 cents for each additional ounce. Write an equation and solve to determine how much Sarah's package weighs.

Solving Multi–Step Equations
Note–taking Guide

Name **_ANSWER KEY_____**
Date _____

Laughing All the Way to the Bank! Create an equation to solve the *Quarter Quandary*. Let *q* represent the number of quarters.

*Determine that _17_ quarters equal $4.25

$$\begin{aligned} q+q+3&=17 \\ 2q+3&=17 \\ -3&=-3 \\ \frac{2q}{2}&=\frac{14}{2} \\ q&=7 \end{aligned}$$

Step 1: Combine your <u>like</u> terms
Step 2: <u>Subtract</u> to undo the addition.
Step 3: <u>Divide</u> to undo the multiplication

Hint: *When identifying like terms underline those which are alike and then combine.*

You had _7__ quarters at the beginning.

How can you check to determine if your solution is correct?

In order to check your solution, replace *q* with 7 and complete the problem.

$$\begin{aligned} 2q+3&=17 \\ 2(7)+3&=17 \\ 14+3&=17 \\ 17&=17 \end{aligned}$$

Solve each equation. Check your solution.

<u>Ex. 1</u> $28-4(r-5)=-4$

$$\begin{aligned} 28-4r+20&=-4 \\ -4r+48&=-4 \\ -4r&=-52 \\ r&=13 \end{aligned}$$

Check:

$$\begin{aligned} 28-4(r-5)&=-4 \\ 28-4(13-5)&=-4 \\ 28-4(8)&=-4 \\ 28-32&=-4 \\ -4&=-4 \end{aligned}$$

Your Turn: $100+12(a-8)=-68$

$$\begin{aligned} 100+12a-96&=-68 \\ 12a+4&=-68 \\ 12a&=-72 \\ a&=-6 \end{aligned}$$

Check:

$$\begin{aligned} 100+12(a-8)&=-68 \\ 100+12(-6-8)&=-68 \\ 100+12(-14)&=-68 \\ 100-168&=-68 \\ -68&=-68 \end{aligned}$$

Ex. 2

$$21-\frac{1}{3}x+19=35$$
$$40-\frac{1}{3}x=35$$
$$-\frac{1}{3}x=-5$$
$$x=15$$

Check:

$$21-\frac{1}{3}x+19=35$$
$$21-\frac{1}{3}(15)+19=35$$
$$21-5+19=35$$
$$35=35$$

Your Turn:

$$-64+\frac{2}{5}x-11=-79$$
$$-75+\frac{2}{5}x=-79$$
$$\frac{2}{5}x=-4$$
$$x=-10$$

Check:

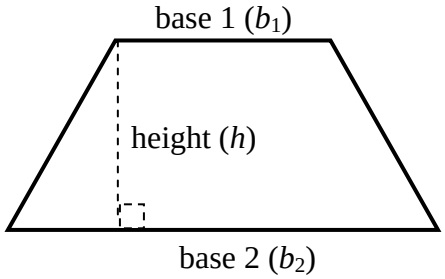
$$-64+\frac{2}{5}x-11=-79$$
$$-64+\frac{2}{5}(-10)-11=-79$$
$$-64-4-11=-79$$
$$-79=-79$$

Ex. 3

The area, A, of a trapezoid can be found by multiplying the height h and one–half the sum of the lengths of the bases b_1 and b_2. The formula is $A=\frac{1}{2}h(b_1+b_2)$.

The area of the trapezoid at the right is 84 square inches. The trapezoid is 8 inches high, and the length of one of the bases is 9 inches. What is the length of the other base?

$$A=\frac{1}{2}h(b_1+b_2)$$
$$84=\frac{1}{2}(8)(b_1+9)$$
$$84=4(b_1+9)$$
$$84=4b_1+36$$
$$48=4b_1$$
$$12=b_1$$



Your Turn: Use the formula for the area of the trapezoid to find the length of the other base of a trapezoid with one base 8.3 centimeters long, a height of 3.6 centimeters, and an area of 24.12 square centimeters. Draw a picture of the trapezoid labeling its dimensions.

$$A=\frac{1}{2}(h)(b_1+b_2)$$
$$24.12=\frac{1}{2}(3.6)(b_1+8.3)$$
$$24.12=1.8(b_1+8.3)$$
$$24.12=1.8b_1+14.94$$
$$9.18=1.8b_1$$
$$5.1=b_1$$

Steps to solving Multi-Step Equations

1. Simplify the equation. Simplify by __combining_____ like terms and/or using the ___distributive_____ property if needed.

2. Undo _subtraction__ and/or _addition_ by performing its inverse operation on both sides of the equation.

3. Undo __multiplication_ and/or _division__ by performing its inverse operation on both sides of the equation.

Solving Equations
Practice Problems

Name: __**ANSWER KEY**_____
Date: _____

Solve each equation. Check your solution.

1. $$\begin{aligned} -58-5(7y+9) &= -278 \\ -58-35y-45 &= -278 \\ -35y-103 &= -278 \\ -35y &= -175 \\ y &= 5 \end{aligned}$$	2. $$\begin{aligned} -2.5(a+2a) &= 22.5 \\ -2.5a-5a &= 22.5 \\ -7.5a &= 22.5 \\ a &= 3 \end{aligned}$$
3. $$\begin{aligned} &\frac{1}{5}(25-15x)+16=30 \\ &5-3x+16=30 \\ &-3x+21=30 \\ &-3x=9 \\ &x=-3 \end{aligned}$$	4. Sarah mailed some photographs to her friend Jamal. She paid $1.65 to send them first class. The Post Office charges 39 cents for the first ounce and 21 cents for each additional ounce. Write an equation and solve to determine how much Sarah's package weighs. $$\begin{aligned} 1.65 &= .39+.21x \\ 1.26 &= .21x \\ 6 &= x \end{aligned}$$ Sarah's package weighs 7 ounces.(the 6 represents each additional ounce after the first ounce).

Solving Multi–Step Equations
Partner Pass

Name _____
Date _____

Directions: You and a partner will work together in solving multi–step equations. Partner A will complete the first step and then pass the paper to Partner B who will check his or her partner's work, complete the second step, and so on until the problem is complete.

<u>Beware</u>: Next to each problem is the number of steps it will take to complete the problem.

1. $-4(5h+2)-22=-40$ *(4 steps)*

2. $8m-32+7m-34=9$ *(3 steps)*

3. $\dfrac{24b+6-9b}{3}=-33$ *(4 steps)*

4. $\dfrac{2}{3}(12-6a+6)=56$ *(4 steps)*

Solving Multi–Step Equations
Partner Pass

Name _____
Date _____

Directions: You and a partner will work together in solving multi–step equations. Partner A will complete the first step and then pass the paper to Partner B who will check his or her partner's work, complete the second step, and so on until the problem is complete.

<u>Beware</u>: Next to each problem is the number of steps it will take to complete the problem.

1. $-4(5h+2)-22=-40$ *(4 steps)*

$$-20h-8-22=-40$$
$$-20h-30=-40$$
$$-20h=-10$$
$$h=\frac{1}{2}=0.5$$

2. $8m-32+7m-34=9$ *(3 steps)*

$$15m-66=9$$
$$15m=75$$
$$m=3$$

3. $\dfrac{24b+6-9b}{3}=-33$ *(4 steps)*

$$\frac{15b+6}{3}=-33$$
$$15b+6=-99$$
$$15b=-105$$
$$b=-7$$

4. $\frac{2}{3}(12-6a+6)=56$ *(4 steps)*

$$\frac{2}{3}(-6a+18)=56$$
$$-4a+12=56$$
$$-4a=44$$
$$a=-11$$

Name _____ Date _____ Pd _____

Solving Multi–Step Equations
Brief Constructed Response

Part A. The length of a rectangle is 5 more than twice its width. Its perimeter is 88 feet. Find the dimensions of the rectangle.

Part B. Use what you know about solving multi–step equations to explain how you received your answer to Part A. Use words and/or numbers to support your explanation.

_____

_____

_____

_____

_____

_____

Name _____ Date _____ Pd _____

Solving Multi–Step Equations
Brief Constructed Response

Part A. The length of a rectangle is 5 more than twice its width. Its perimeter is 88 feet. Find the dimensions of the rectangle.

Part B. Use what you know about solving multi–step equations to explain how you received your answer to Part A. Use words and/or numbers to support your explanation.

_____

_____

_____

_____

_____

_____

Name _____ Date _____ Pd _____

Solving Multi–Step Equations
Brief Constructed Response: Answer Key

Part A. The length of a rectangle is 5 more than twice its width. Its perimeter is 88 feet. Find the dimensions of the rectangle.

width = 13 ft, length = 31 ft

Part B. Use what you know about solving multi–step equations to explain how you received your answer to Part A. Use words and/or numbers to support your explanation.

$88 = 2(2w + 5) + 2w$	Original equation
$88 = 4w + 10 + 2w$	Use the distributive property.
$88 = 6w + 10$	Combine like terms.
$-10 \quad\quad -10$	Subtract 10 from both sides to undo addition.
$\frac{78}{6} = \frac{6w}{6}$	Divide both sides by 6 to undo multiplication.
width = 13 ft	
length = $2w + 5$	Substitute 13 for *w*.
$2(13) + 5$	
$26 + 5$	
length = 31 ft	

Another Day of Solving Equations!
Warm–Up

Solve each equation.

1) $3x - 4 = 11$

2) $7 = 3 - 2y$

3) $2x - 12 = 6$

4) $11n + 1 = 67$

CHALLENGE: $2x + 4(x - 3) = 2^2 \cdot 3$

Another Day of Solving Equations!
Warm–Up

Check your answers!

1) $3x - 4 = 11$

$3x = 15$
$x = 5$

2) $7 = 3 - 2y$

$4 = -2y$
$-2 = y$

3) $2x - 12 = 6$

$2x = 18$
$x = 9$

4) $11n + 1 = 67$

$11n = 66$
$n = 6$

CHALLENGE:

$$2x + 4(x - 3) = 2^2 \cdot 3$$
$$2x + 4x - 12 = 4 \cdot 3$$
$$6x - 12 = 12$$
$$6x = 24$$
$$x = 4$$

Examples for Day 3:

Ex 1) $7x + 6 = 41$

Tory wants to buy a video game that costs $41 but only has $6 in savings. Tory knows she can earn $7 for every hour she baby–sits her little brother. How many hours does Tory have to work to earn enough money to buy her game?

Ex 2) $5x - 10 = 35$

José owes his brother $10 and wants to buy a jacket that costs $35. If he gets a job that pays $5 for every hour he works, how many hours must José work to buy the jacket and pay his brother back?

Ex 3) $8x + 5 = 69$

Jaden wants to make muffins for her class. Jaden already has 5 muffins, but she needs to make a total of 69 muffins. If each batch makes 8 muffins, how many more batches does Jaden need to make?

Ex 4) $36 - 2x = 14$

Mark's dad charges him $2 every time he forgets to do his homework. Mark had $36 dollars at the beginning of the school year. How many times did Mark forget to do his homework if he only had $14 at the end of the year?

Equations for the students to use for the poster activity.

$4x + 15 = 31$
$2x - 7 = 11$
$4 - 2x = 8$
$20 = 6x + 8$
$9x + 36 = 72$
$5x + 4 = 64$
$44 = -4 + 8x$
$33 = 5x - 12$
$4x + 3 = 19$
$2x - 7 = 1$
$85 = 4x + 5$
$2x - 5 = 21$
$2x + (-6) = 8$
$20 = 4 + 2x$

Enrichment: Seek and Find

Work in small groups to search for equations with solutions of 1 to 20. The equations may be written horizontally, vertically or diagonally. They may also be written backwards! Groups need to hand in a sheet of paper with the group members' names and all equations with solutions worked out.

2*y*	15	=	14	–	2*x*	+	5	=	19	14
+	9	–	3	3*y*	–	58	=	–4	=	*x*
8	–5	12	*x*	26	7	1	5*x*	6*x*	1	12
=	–	2*x*	–	8	=	18	=	6	+	m
16	–2*x*	+	10	–9	17	6	–	3*x*	2*x*	+
+	=	24	+	8	=	15	+	7	=	4a
7	–45	2a	–	30	=	4	+	4*x*	=	64
50	–	–	16	19	=	3*x*	+	–6	+	=
–	3*y*	11	21	10	+	1	7*y*	8	18	*y*
2*x*	=	=	+	–6	=	–5	–	*x*	9	+
=	4	9	=	13	–	2a	+	20	=	48
12	5	*y*	–	7	=	–1	+	5a	=	14