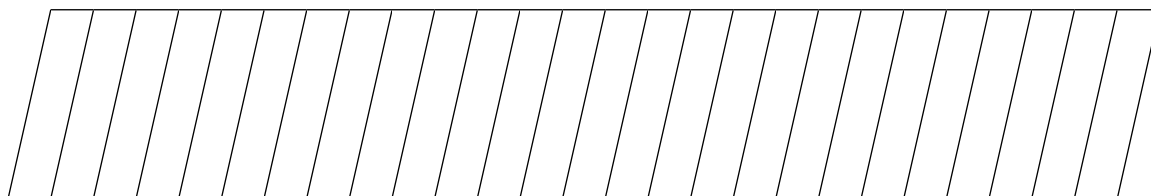


CLASS ASSESSMENT CHECKLIST



Categories/Mathematical Process/Criteria

Thinking																				
Reasoning and Proving	The student:																			
	Identifies errors in given solutions and verifies that a solution is correct (Action)																			
	Describes reasons for his or her answers orally or in writing (Action)																			
Communication																				
Representing	The student:																			
	Selects and applies a representation to solve a given problem, e.g., uses a graph, equations or manipulatives (Minds On)																			
	Compares and contrasts the effectiveness of solutions using various representations (Minds On)																			
Communicating	The student demonstrates appropriate use of mathematical conventions when solving linear equations (Action). Specifically, the student...																			
	Uses 1 equal sign per line																			
	Shows steps in his or her solution																			
	Can explain the steps in a solution orally or on paper																			



SELF-ASSESSMENT—SOLVING LINEAR EQUATIONS

Name: _____

Today, you will be deepening your understanding of solving linear equations. Use the following checklist to identify your comfort level with each of the concepts listed. You will complete this self-assessment twice this period: once now and once at the end of the period.	Before <i>Fill this in before completing the activities</i>			After <i>Fill this in after completing the activities</i>		
	Agree	Not Sure	Disagree	Agree	Not Sure	Disagree
Thinking—Mathematical Process: Reasoning and Proving						
I can work effectively with negative numbers	A	N	D	A	N	D
I can use distributive law to remove brackets from an equation	A	N	D	A	N	D
I can use each of the following inverse operations to isolate a variable:						
Addition	A	N	D	A	N	D
Subtraction	A	N	D	A	N	D
Division	A	N	D	A	N	D
Communication—Mathematical Process: Communicating						
I can explain to someone how to solve an equation	A	N	D	A	N	D
I can verify that a solution to an equation is correct	A	N	D	A	N	D
I can identify errors in a solution	A	N	D	A	N	D

Complete the following at the end of the period and submit this page to your teacher.

1. On a scale of one to five, how much more confident are you in your ability to solve equations?

1	2	3	4	5
No more confident				Much more confident

2. What part of today's learning most helped to develop your confidence in solving equations? _____

3. I need more assistance when I : _____



TIER 1: ASSIGNMENT A (page 1 of 2)

Assignment A, Activity 1

Choose a partner within your group and decide who will be partner A and partner B.

Referring to the Guided Discussion Script (Appendix C1, p. 2), start by skimming through the solution given, and then read the script out loud starting at the top.

As you read through the script, carefully examine each line of the solution before reading each question.

Assignment A, Activity 2

Solve each of the following questions on a separate piece of paper as indicated.

The coach in each question should explain **what** to do at each step of the solution **and** explain **why** they are performing each operation.

Equation 1: A writes, B coaches: $2(2x + 3) = 7x + 2$

Equation 2: B writes, A coaches: $9x - 7 = -2(x - 2)$

Equation 3: Solve it on your own **and then** verify your solution with your partner: $2(x + 3) = 4x - 7$

Assignment A, Activity 3

The equation $3x - 7 = 9x + 5$ was solved by three different students, as shown below. Only one of their solutions is correct!

Determine which student was correct and then verify that solution using substitution.

For the incorrect solutions, identify and describe the error(s).

Mark's Solution	Merilyn's Solution	Li-Mei's Solution
$3x - 7 = 9x + 5$ $3x - 7 + 7 = 9x + 5 + 7$ $3x = 9x + 12$ $3x - 9x = 9x - 9x + 12$ $-6x = 12$ $\frac{-6x}{-6} = \frac{12}{-6}$ $-12 = -12$ $x = -0.5$	$3x - 7 = 9x + 5$ $3x - 7 - 7 = 9x + 5 - 7$ $3x = 9x - 2$ $3x - 9x = 9x - 9x - 2$ $-6x = -2$ $\frac{-6x}{-6} = \frac{-2}{-6}$ $-6 = -6$ $x = 0.\bar{3}$	$3x - 7 = 9x + 5$ $3x - 9x - 7 = 9x - 9x + 5$ $-6x - 7 = +5$ $-6x - 7 + 7 = +5 + 7$ $-6x = 12$ $\frac{-6x}{-6} = \frac{12}{-6}$ $-6 = -6$ $x = -2$



TIER 1: ASSIGNMENT A (page 2 of 2)

Activity 1 – Guided Discussion Script

	Student A – Read the questions and responses marked with an A out loud Student B – Read the questions and responses marked with a B out loud
$3(x + 4) = -2x + 8$	
$3x + 12 = -2x + 8$	<p>A: Where did the 12 come from in this line of the solution? (Highlight the 12.)</p> <p>B: The distributive property was used to expand the brackets to simplify the left hand side of the original equation. (Highlight the distributive property.)</p>
$3x + 12 - 12 = -2x + 8 - 12$	<p>B: Why is there a -12 on both sides of the equation? (Highlight the -12 on both sides.)</p> <p>A: Since 12 was being added to the $3x$, subtracting 12 on the left side isolated the $3x$. However, we have to subtract 12 on both sides of the equation to keep it balanced.</p>
$3x = -2x - 4$	<p>B: How did the right hand side of the equation become $-2x - 4$? (Highlight the -4.)</p> <p>A: Since $+8$ and -12 are like terms, they can be simplified. So $+8 - 12 = -4$. But $-2x$ is not a like term, because it has an x attached, so it cannot be added to the -12. The right hand side is simplified as much as possible.</p>
$3x + 2x = -2x + 2x - 4$	<p>A: Why is there a $+2x$ on the left side of the equation now? (Highlight the $+2x$ on both sides.)</p> <p>B: We want to have all of our variable terms on one side of the equation. Since there was a $-2x$ on the right side of the equation, we have to add $2x$ to eliminate it from the right side. We also add $2x$ to the left side so that our equation stays balanced.</p>
$5x = -4$	<p>B: Where did the $5x$ come from? (Highlight the $5x$.)</p> <p>A: The $5x$ came from adding the $2x$ and $3x$ in the previous step.</p>
$\frac{5x}{5} = \frac{-4}{5}$	<p>B: What operation is happening in this step?</p> <p>A: Remember that we want to isolate the x, but there was a 5 attached to it. Since the operation holding the 5 and the x together is multiplication, the 5 can be removed using division. If we divide one side by 5 then we have to do the same to the other side so that our equation stays balanced. (Highlight the division by 5 on both sides.)</p>
$x = -0.8$	<p>B: Where did the -0.8 come from? (Highlight the -0.8.)</p> <p>A: When we divide -4 by 5 we get -0.8. The x is now isolated, so we know that -0.8 is the value of x!</p>



TIER 2: ASSIGNMENT B**Assignment B, Activity 1**

Sophia made a few mistakes when solving the equation $5(2x - 7) = 8x + 9$ as shown below:

$$\begin{aligned}5(2x - 7) &= 8x + 9 \\10x - 7 &= 8x + 9 \\2x - 7 &= 9 \\2x &= 2 \\x &= 0\end{aligned}$$

- With your partner, determine all the mistakes Sophia made.
- Explain what the error in Sophia's thinking might have been.
- Individually, solve the equation $5(2x - 7) = 8x + 9$ and then compare your solution to your partner's. How were your solutions the same? How were they different?

Assignment B, Activity 2

Create an equation that has the solution $x = 4$ and write a perfect solution to your equation.

Pass your equation (without the solution) to your partner and ask him or her to solve it.

Check your partner's solution.

Assignment B, Activity 3

Create a poster that would help someone else remember how to solve an equation algebraically.

Your poster could contain a written description (e.g., a story), a graphic organizer (e.g., a Flow Chart, Mind Map, etc.), a recipe, or a drawing.



TIER 3: ASSIGNMENT C (page 1 of 2)

Name: _____

Assignment C, Activity 1

Sherif is having difficulty with algebra. He thinks his solutions *look* good, but he's still not getting anything right and he's asked you to look at his work. Circle all his errors to determine the type(s) of errors he is making (e.g., distributing incorrectly, adding integers incorrectly). Remember, if he makes a mistake at the beginning of the solution, then you still need to see if the rest of the solution is correct after the error.

Question 1	Question 2	Question 3
$4(x + 6) = 9x - 4$ $4x + 6 = 9x - 4$ $4x + 6 - 6 = 9x - 4 - 6$ $4x = 9x + 10$ $4x - 9x = 9x - 9x + 10$ $-5x = 10$ $\frac{-5x}{-5} = \frac{10}{-5}$ $x = -2$	$2x - 7 = 5 - 3x$ $2x - 7 - 7 = 5 - 7 - 3x$ $2x = -2 - 3x$ $2x - 3x = -2 - 3x - 3x$ $-1x = -2$ $\frac{-1x}{-1} = \frac{-2}{-1}$ $x = 2$	$3(x + 6) = -5(x - 4)$ $3x + 6 = -5x - 4$ $3x + 6 - 6 = -5x - 4 - 6$ $3x = -5x + 10$ $3x - 5x = -5x - 5x + 10$ $-2x = 10$ $\frac{-2x}{-2} = \frac{10}{-2}$ $x = -5$
Types of errors:	Types of errors:	Types of errors:

Write a brief letter to Sherif telling him about the types of errors he's making and describing ways he could remember how to solve equations correctly.



TIER 3: ASSIGNMENT C (page 2 of 2)

Assignment C: Activity 2

Three different students correctly solved the equation $2(x + 3) = 12(x - 7)$ as shown below.

Crystal's Solution	Bryon's Solution	Sasha's Solution
$2(x + 3) = 12(x - 7)$	$2(x + 3) = 12(x - 7)$	$2(x + 3) = 12(x - 7)$
$2x + 6 = 12x - 84$	$2x + 6 = 12x - 84$	$\frac{2(x + 3)}{2} = \frac{12(x - 7)}{2}$
$2x - 2x + 6 = 12x - 2x - 84$	$2x + 6 - 6 = 12x - 84 - 6$	$x + 3 = 6(x - 7)$
$6 = 10x - 84$	$2x = 12x - 90$	$x + 3 = 6x - 42$
$6 + 84 = 10x - 84 + 84$	$2x - 12x = 12x - 12x - 90$	$x + 3 - 3 = 6x - 42 - 3$
$90 = 10x$	$-10x = -90$	$x = 6x - 45$
$\frac{90}{10} = \frac{10x}{10}$	$\frac{-10x}{-10} = \frac{-90}{-10}$	$x - 6x = 6x - 6x - 45$
$9 = x$	$x = 9$	$-5x = -45$
		$\frac{-5x}{-5} = \frac{-45}{-5}$
		$x = 9$

On a separate piece of paper, write to explain what is the same and what is different about the three solutions. Which solution do you prefer? Why?

Assignment C: Activity 3

George says this equation can't be solved: $3(2x - 7) = 5 + 6x$. Why can't George's equation be solved? (Hint: attempt to solve it and see what happens.)

On a separate piece of paper, create two new equations: one that *is* solvable and one that is *not* solvable.

Select a partner in your group and pass the equations to your partner.

Ask your partner to attempt to solve both equations and identify which one is solvable and which one is not.

Check your partner's solutions.



PEER ASSESSMENT—SOLVING LINEAR EQUATIONS

My Name: _____

Partner's Name: _____

Place a check mark (✓) beside each statement that describes your partner's problem solving today.

My partner:

- Uses distributive law to remove brackets from equations (Thinking—Reasoning and Proving)
- Uses inverse operations to isolate a variable (Thinking—Reasoning and Proving)
- Works effectively with negative numbers (Thinking—Reasoning and Proving)
- Verifies that solutions are correct (Thinking—Reasoning and Proving)
- Identifies errors in solutions (Communication—Communicating)
- Explains his or her thinking when solving a problem (Communication—Communicating)



LINEAR EQUATIONS PUZZLE



Solution 1	Solution 2	Solution 3	Solution 4
$7x - 6 = 5(x - 2)$	$-4x + 6 - 5x = -8x - 4$	$-5 - 3x = 7x - 4$	$-20 = 3(-2m + 3) + 1$
$7x - 6 = 5x - 10$	$-9x + 6 = -8x - 4$	$-5 + 4 - 3x = 7x - 4 + 4$	$-20 = -6m + 9 + 1$
$7x - 6 + 6 = 5x - 10 + 6$	$-9x + 8x + 6 = -8x + 8x - 4$	$-1 - 3x = 7x$	$-20 = -6m + 10$
$7x = 5x - 4$	$-1x + 6 = -4$	$-1 - 3x + 3x = 7x + 3x$	$-20 - 10 = -6m + 10 - 10$
$7x - 5x = 5x - 5x - 4$	$-1x + 6 - 6 = -4 - 6$	$-1 = 10x$	$-30 = -6m$
$2x = -4$	$-1x = -10$	$-0.1 = x$	$\frac{-30}{-6} = \frac{-6m}{-6}$
$\frac{2x}{2} = \frac{-4}{2}$	$\frac{-1x}{-1} = \frac{-10}{-1}$		$5 = m$
$x = -2$	$x = 10$		

