Algebra 1 Readiness Intervention Lessons

Readiness Standard 1 - 8.EE.7b

Learning Target: I will solve multi-step linear equations in one variable

Readiness for A.REI.6: Solve systems of linear equations

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Learning Target: I will solve multi-step linear equations in one variable.

IES Recommendations for Improving Algebra Knowledge:

Recommendation
1. Use solved problems to engage students in analyzing algebraic reasoning and strategies.
2. Teach students to utilize the structure of algebraic representations.
3. Teach students to intentionally choose from alternative algebraic strategies when solving problems.

(Teaching Strategies for Improving Algebra Knowledge in
Middle and High School Students, 2015, p. 3)

High School Planning Guide

Algebra 1 - Readiness Standard 1 - 8.EE.7b

	Recommended Actions ≈ 30 minutes
Beginning *(5 min.)*	➢ **Review** the learning target with the whole group. ➢ For sessions 3 and 4, ask each student to **set a personal goal** for the day based on their previous Quick Check Score and use a highlighter to plot their goal on their Growth Chart.

Middle *(15 min.)*	➢ **Guided Practice**
	
	   o **Whole Group (Analyze solved problems)**
	     ▪ The teacher covers up all solution steps except the first two.
	     ▪ The teacher asks, "What math happened?" and elicits student responses to fill in the missing information.
	     ▪ The teacher answers student questions to clarify the solution step.
	     ▪ The teacher uncovers the next answer blank and repeats the analysis.
	
	   o **Pairs (Gradual release to solve problems)**
	     ▪ Students take turns leading to "think aloud" while completing each problem.

End *(10 min.)*	➢ **Reflect, Assess and Monitor Progress**
	
	   o Ask students to **reflect** on their progress towards the learning target.
	     ▪ What did I learn today about the learning target?
	     ▪ How confident do I feel about doing the learning target on my own?
	
	   o **Assess** each student's progress using a Quick Check.
	
	   o Guide students to **self-correct** their Quick Check.
	
	   o Guide students to **chart their progress** in their Growth Chart.
	     ▪ If not using Delta Math lessons, record the activity in the table.
	
	   o Collect each student's Quick Check and Growth Chart.

After	➢ **Exit** students who meet or exceed the learning goal for a third time.

Learning Target: I will solve multi-step linear equations   Algebra 1 – Readiness Standard 1 – 8.EE.7b

Readiness for solving systems of linear equations

Session 1: Guided Practice (Whole Group)

1. Say the equation and use number sense to find each solution.

Equation	Solution	Why?
$x + 3 = 5$ **What number plus 3 is equal to 5?**	$x =$ _____	Because _____ + 3 = 5
$x + 6 = 10$	$x =$ _____	Because _____ + 6 = 10
$x - 3 = 5$	$x =$ _____	Because _____ + 3 = 5
$8 - x = 6$	$x =$ _____	Because 8 – _____ = 6
$2x = 8$	$x =$ _____	Because 2 • _____ = 8
$\frac{1}{2}x = 6$	$x =$ _____	Because $\frac{1}{2}$ • _____ = 6

2. a. Is 5 a solution to the equation $2x + 1 = 9$? _____

b. How do you know? _____

Learning Target: I will solve multi-step linear equations   Algebra 1 – Readiness Standard 1 – 8.EE.7b

Readiness for solving systems of linear equations

Session 1: Guided Practice (Whole Group – Cont.)

Definition: *The solution to an equation is the value of the variable that makes the equation true.*

3. Below are steps to check if $x = 2$ is a solution to the equation $2x + 1 = 5x - 8$.
   For each solution step, discuss what happened and fill in the missing information.

Draw	Write	Describe
	$2x + 1 = 5x - 8$	
	$2x + 1 = 5x + \text{-}8$	**Changed subtraction to "add the opposite"** $5x - 8 \rightarrow$ _____ + _____ to model the equation with algebra tiles
	$2 \cdot 2 + 1 \overset{?}{=} 5 \cdot 2 + \text{-}8$	**Substituted** $2x \rightarrow 2 \cdot$ _____ and $5x \rightarrow 5 \cdot$ _____ to evaluate each algebraic expression
	$4 + 1 \overset{?}{=} 10 + \text{-}8$	**Multiplied** _____ • _____ $\rightarrow$ 4 and _____ • _____ $\rightarrow$ 10 to simplify using order of operations
	$5 \neq 2$	**Added and Compared** _____ + _____ $\rightarrow$ 5 and _____ + _____ $\rightarrow$ 2 5 and 2 are _____ to simplify each expression and check for equality
	2 is **not** a solution	**Decided** 2 is not a solution because the two sides of the equation are _____

Name _____ Date _____

Learning Target: I will solve multi-step linear equations   Algebra 1 – Readiness Standard 1 – 8.EE.7b

Readiness for solving systems of linear equations

Session 1: Guided Practice (Whole Group – Cont.)

Definition: The solution to an equation is the value of the variable that makes the equation true.

4. Below are steps to check if $x = 3$ is a solution to the equation $2x + 1 = 5x - 8$.
For each solution step, discuss what happened and fill in the missing information.

Draw	Write	Describe
	$2x + 1 = 5x - 8$	
+x +x + ∥ +x +x +x +x +x − − − − − − − − −	$2x + 1 = 5x + \text{-}8$	**Changed subtraction to "add the opposite"** $5x - 8 \rightarrow$ _____ + _____ to model the equation with algebra tiles
+++ +++ + ∥ +++ +++ +++ +++ +++ − − − − − − − − −	$2 \cdot 3 + 1 \overset{?}{=} 5 \cdot 3 + \text{-}8$	**Substituted** $2x \rightarrow 2 \cdot$ _____ and $5x \rightarrow 5 \cdot$ _____ to evaluate each algebraic expression
	$6 + 1 \overset{?}{=} 15 + \text{-}8$	**Multiplied** _____ • _____ $\rightarrow$ 6 and _____ • _____ $\rightarrow$ 15 to simplify using order of operations
+++ +++ + ∥ + + + ++ ++	$7 = 7$	**Added and Compared** _____ + _____ $\rightarrow$ 7 and _____ + _____ $\rightarrow$ 7 7 and 7 are _____ to simply each expression and check for equality
	3 is a solution	**Decided** 3 is a solution because the two sides of the equation are _____

Learning Target: I will solve multi-step linear equations   Algebra 1 – Readiness Standard 1 – 8.EE.7b

Session 1: Guided Practice (Pairs)

Directions: Complete the steps to check if the given value is a solution.

5. Is $x = 2$ a solution? (Yes) or No	**6.** Is $x = 4$ a solution? Yes or No

5.

$$4x - 1 = x + 5$$

$$4x + \text{-}1 = x + 5$$

$$4 \cdot \underline{\hspace{1cm}} + \text{-}1 \overset{?}{=} \underline{\hspace{1cm}} + 5$$

$$\underline{\hspace{1cm}} + \text{-}1 \overset{?}{=} \underline{\hspace{1cm}}$$

$$\underline{\hspace{1cm}} = \underline{\hspace{1cm}}$$

6.

$$3x - 4 = 5x - 10$$

$$3x + \text{-}4 = 5x + \underline{\hspace{1cm}}$$

$$3 \cdot \underline{\hspace{1cm}} + \text{-}4 \overset{?}{=} 5 \cdot \underline{\hspace{1cm}} + \underline{\hspace{1cm}}$$

$$\underline{\hspace{1cm}} + \text{-}4 \overset{?}{=} \underline{\hspace{1cm}} + \underline{\hspace{1cm}}$$

$$\underline{\hspace{1cm}} \qquad \underline{\hspace{1cm}}$$

7. Is $x = 4$ a solution? (Yes) or No	**8.** Is $x = 7$ a solution? Yes or No

7.

$$2(3x - 4) = x + 12$$

$$2(3 \cdot \underline{\hspace{1cm}} + \underline{\hspace{1cm}}) = x + 12$$

$$2(\underline{\hspace{1cm}} + \underline{\hspace{1cm}}) \overset{?}{=} \underline{\hspace{1cm}} + 12$$

$$2(\underline{\hspace{1cm}}) \overset{?}{=} \underline{\hspace{1cm}}$$

$$\underline{\hspace{1cm}} = \underline{\hspace{1cm}}$$

8.

$$3x - 6 = 5(x - 4)$$

$$3x + \text{-}6 = 5(x + \underline{\hspace{1cm}})$$

$$3 \cdot \underline{\hspace{1cm}} + \text{-}6 \overset{?}{=} 5(\underline{\hspace{1cm}} + \underline{\hspace{1cm}})$$

$$\underline{\hspace{1cm}} + \text{-}6 \overset{?}{=} 5(\underline{\hspace{1cm}})$$

$$\underline{\hspace{1cm}} \qquad \underline{\hspace{1cm}}$$

9. Is $x = 6$ a solution? Yes or (No)	**10.** Is $x = 5$ a solution? Yes or No

9.

$$2(3x + 1) = 4(x + 3)$$

$$2(3 \cdot \underline{\hspace{1cm}} + 1) = 4(\underline{\hspace{1cm}} + 3)$$

$$2(\underline{\hspace{1cm}} + 1) \overset{?}{=} 4(\underline{\hspace{1cm}})$$

$$2(\underline{\hspace{1cm}}) \overset{?}{=} \underline{\hspace{1cm}}$$

$$\underline{\hspace{1cm}} \neq \underline{\hspace{1cm}}$$

10.

$$3(x + 5) = 5(2x - 4)$$

$$3(x + 5) \overset{?}{=} 5(2x + \underline{\hspace{1cm}})$$

$$3(\underline{\hspace{1cm}} + 5) \overset{?}{=} 5(2 \cdot \underline{\hspace{1cm}} + \underline{\hspace{1cm}})$$

$$3(\underline{\hspace{1cm}}) \overset{?}{=} 5(\underline{\hspace{1cm}} + \underline{\hspace{1cm}})$$

$$\underline{\hspace{1cm}} \overset{?}{=} 5(\underline{\hspace{1cm}})$$

$$\underline{\hspace{1cm}} \qquad \underline{\hspace{1cm}}$$

Learning Target: I will solve multi-step linear equations   Algebra 1 – Readiness Standard 1 – 8.EE.7b

Readiness for solving systems of linear equations

Session 1: Guided Practice (Teacher Notes)

1. Say the equation and use number sense to find each solution.

Equation	Solution	Why?
$x + 3 = 5$ **What number plus 3 is equal to 5?**	$x = $ __**2**__	Because __**2**__ + 3 = 5
$x + 6 = 10$ **What number plus 6 is equal to 10**?	$x = $ __**4**__	Because __**4**__ + 6 = 10
$x - 3 = 5$ **What number minus 3 is equal to 5**?	$x = $ __**8**__	Because __**8**__ + 3 = 5
$8 - x = 6$ **8 minus what number is equal to 6?**	$x = $ __**2**__	Because 8 – __**2**__ = 6
$2x = 8$ **2 times what number is equal to 8?**	$x = $ __**4**__	Because 2 • __**4**__ = 8
$\frac{1}{2}x = 6$ **One-half of what number is equal to 6?**	$x = $ __**12**__	Because $\frac{1}{2}$ • __**12**__ = 6

2 times what number plus 1 is equal to 9?

2. a. Is 5 a solution to the equation $2x + 1 = 9$? <u>No</u>

   b. How do you know? <u>2 • **5** + 1 = 11, not 9</u>

Learning Target: I will solve multi-step linear equations   Algebra 1 – Readiness Standard 1 – 8.EE.7b

Readiness for solving systems of linear equations

Session 1: **Guided Practice** (Teacher Notes – Cont.)

Definition: The solution to an equation is the value of the variable that makes the equation true.

3. Below are steps to check if $x = 2$ is a solution to the equation $2x + 1 = 5x - 8$.
      For each solution step, discuss what happened and fill in the missing information.

Draw	Write	Describe
	$2x + 1 = 5x - 8$	➔ can be read as *"Became" or "Changed To"*
	$2x + 1 = 5x + \text{-}8$	**Changed subtraction to "add the opposite"** $5x - 8$ ➔ **$5x$** + **-8** to model the equation with algebra tiles
	$2 \cdot 2 + 1 \overset{?}{=} 5 \cdot 2 + \text{-}8$	**Substituted** $2x$ ➔ $2 \cdot$ **2** and $5x$ ➔ $5 \cdot$ **2** to evaluate each algebraic expression
	$4 + 1 \overset{?}{=} 10 + \text{-}8$	**Multiplied** **2** $\cdot$ **2** ➔ 4 and **5** $\cdot$ **2** ➔ 10 to simplify using order of operations
	$5 \neq 2$	**Added and Compared** **4** + **1** ➔ 5 and **10** + **-8** ➔ 2 5 and 2 are **not equal** to simply each expression and check for equality
	2 is **not** a solution	**Decided** 2 is not a solution because the two sides of the equation are **not equal**

Learning Target: I will solve multi-step linear equations   Algebra 1 – Readiness Standard 1 – 8.EE.7b

Readiness for solving systems of linear equations

Session 1: **Guided Practice** (Teacher Notes – Cont.)

Definition: *The solution to an equation is the value of the variable that makes the equation true.*

4. Below are steps to check if $x = 3$ is a solution to the equation $2x + 1 = 5x - 8$.
For each solution step, discuss what happened and fill in the missing information.

Draw	Write	Describe
	$2x + 1 = 5x - 8$	➔ can be read as *"Became" or "Changed To"*
	$2x + 1 = 5x + \text{-}8$	**Changed subtraction to "add the opposite"** $5x - 8$ ➔ **5x** + **-8** to model the equation with algebra tiles
	$2 \cdot 3 + 1 \overset{?}{=} 5 \cdot 3 + \text{-}8$	**Substituted** $2x$ ➔ $2 \cdot$ **3** and $5x$ ➔ $5 \cdot$ **3** to evaluate each algebraic expression
	$6 + 1 \overset{?}{=} 15 + \text{-}8$	**Multiplied** **2·3** ➔ 6 and **5·3** ➔ 15 to simplify using order of operations
	$7 = 7$	**Added and Compared** **6** + **1** ➔ 7 and **15** + **-8** ➔ 7 7 and 7 are **equal** to simply each expression and check for equality
	3 is a solution	**Decided** 3 is a solution because the two sides of the equation are **equal**

Learning Target: I will solve multi-step linear equations

Briefly discuss student responses

> What did I learn today about solving multi-step linear equations?

> How confident do I feel about solving multi-step linear equations on my own?
> *(Thumbs up, down, or sideways)*

No Quick Check Today!

DELTA MATH
R2I PROGRAM

Learning Target: I will solve multi-step linear equations   Algebra 1 – Readiness Standard 1 – 8.EE.7b

Readiness for solving systems of linear equations

Session 2: Guided Practice (Whole Group)

1. Below are steps to find the solution to the equation $2x + 1 = 5x - 8$.
For each solution step, discuss what happened and fill in the missing information.

Draw	Write	Describe
	$2x + 1 = 5x - 8$	
	$2x + 1 = 5x + \text{-}8$	**Changed subtraction to "add the opposite"** $5x - 8$ ➔ _____ + _____ to model the equation with algebra tiles
	$\underline{\text{-}2x \qquad\qquad \text{-}2x}$	**Added** $\text{-}2x$ to _____ and _____ to get the terms with the variable on one side of the equal sign
	$1 = 3x + \text{-}8$	**Removed Zero Pairs** _____ + -2x ➔ 0 and _____ + -2x ➔ 3x to simplify the equation
	$\underline{+8 \qquad\qquad +8}$	**Added** 8 to _____ and _____ to get the term with the variable by itself
	$9 = 3x$	**Removed Zero Pairs** _____ + 8 ➔ 9 and _____ + 8 ➔ 0 to simplify the equation
	$\dfrac{}{3} \quad \dfrac{}{3}$	**Divided** _____ and _____ by 3 to get the variable by itself
	$3 = x$	**Simplified** _____ ÷ 3 ➔ 3 and _____ ÷ 3 ➔ x to find the solution to the equation

Learning Target: I will solve multi-step linear equations   Algebra 1 – Readiness Standard 1 – 8.EE.7b

Readiness for solving systems of linear equations

Session 2: Guided Practice (Whole Group – Cont.)

2. Below are steps to find the solution to the equation $4(x - 2) = 2x - 4$.
For each solution step, discuss what happened and fill in the missing information.

Draw	Write	Describe
	$4(x - 2) = 2x - 4$	
	$4(x + -2) = 2x + -4$	**Changed subtraction to "add the opposite"** $4(x - 2) \rightarrow$ _____ and $2x - 4 \rightarrow$ _____ to model the equation with algebra tiles
	$4x + -8 = 2x + -4$	**Multiplied** $4 \bullet$ ___ $\rightarrow$ ____ and $4 \bullet$ ___ $\rightarrow$ ____ to eliminate the parentheses
	$\underline{-2x \qquad\qquad -2x}$	**Added** $-2x$ to _____ and _____ to get the terms with the variable on one side of the equal sign
	$2x + -8 = -4$	**Removed Zero Pairs** _____ $+ -2x \rightarrow 2x$ and _____ $+ -2x \rightarrow 0$ to simplify the equation
	$\underline{+8 \qquad +8}$	**Added** 8 to _____ and _____ to get the term with the variable by itself
	$2x = 4$	**Removed Zero Pairs** _____ $+ 8 \rightarrow 0$ and _____ $+ 8 \rightarrow 4$ to simplify the equation
	$\dfrac{\quad}{2} \quad \dfrac{\quad}{2}$	**Divided** _____ and _____ by 2 to get the variable by itself
	$x = 2$	**Simplified** _____ $\div 2 \rightarrow x$ and _____ $\div 2 \rightarrow 2$ to find the solution to the equation

Learning Target: I will solve multi-step linear equations   Algebra 1 – Readiness Standard 1 – 8.EE.7b

Session 2: Guided Practice (Pairs)

Directions: Complete the steps used to solve each linear equation.

3. $4x - 1 = x + 5$	**4.** $3x - 4 = 5x - 10$
$4x + \text{-}1 = x + 5$	$3x + \text{-}4 = 5x + \underline{\quad}$
$3x + \text{-}1 = \underline{\quad}$	$\text{-}4 = \underline{\quad} + \underline{\quad}$
$3x = \underline{\quad}$	$6 = 2x$
$x = \underline{\quad}$	$\underline{\quad} = x$
5. $2(3x - 4) = x + 12$	**6.** $3x - 6 = 5(x - 4)$
$2(3x + \underline{\quad}) = x + 12$	$3x + \text{-}6 = 5(x + \underline{\quad})$
$2 \bullet 3x + 2 \bullet \underline{\quad} = x + 12$	$3x + \text{-}6 = 5 \bullet x + \underline{\quad} \bullet \underline{\quad}$
$6x + \underline{\quad} = x + 12$	$3x + \text{-}6 = \underline{\quad} + \underline{\quad}$
$5x + \underline{\quad} = 12$	$\text{-}6 = \underline{\quad} + \underline{\quad}$
$5x = \underline{\quad}$	$14 = 2x$
$x = \underline{\quad}$	$\underline{\quad} = x$
7. $2(3x + 1) = 4(x + 3)$	**8.** $3(x + 5) = 5(2x - 4)$
$2 \bullet \underline{\quad} + 2 \bullet \underline{\quad} = 4 \bullet \underline{\quad} + 4 \bullet \underline{\quad}$	$3(x + 5) = 5(\underline{\quad} + \underline{\quad})$
$6x + 2 = \underline{\quad} + \underline{\quad}$	$3 \bullet \underline{\quad} + 3 \bullet \underline{\quad} = 5 \bullet \underline{\quad} + 5 \bullet \underline{\quad}$
$2x + 2 = \underline{\quad}$	$3x + 15 = \underline{\quad} + \underline{\quad}$
$2x = \underline{\quad}$	$15 = \underline{\quad} + \underline{\quad}$
$x = \underline{\quad}$	$35 = \underline{\quad}$
	$\underline{\quad} = x$

Name _____ Date _____

Learning Target: I will solve multi-step linear equations   Algebra 1 – Readiness Standard 1 – 8.EE.7b

Readiness for solving systems of linear equations

Session 2: Guided Practice (Teacher Notes)

1. Below are steps to find the solution to the equation $2x + 1 = 5x - 8$.
For each solution step, discuss what happened and fill in the missing information.

Draw	Write	Describe
	$2x + 1 = 5x - 8$	➔ can be read as *"Became" or "Changed To"*
	$2x + 1 = 5x + -8$	**Changed subtraction to "add the opposite"** $5x - 8$ ➔ **$5x$ + -8** to model the equation with algebra tiles
	$-2x \qquad -2x$	**Added** $-2x$ to **$2x + 1$** and **$5x + -8$** to get the terms with the variable on one side of the equal sign
	$1 = 3x + -8$	**Removed Zero Pairs** **$2x$** + -2x ➔ 0 and **$5x$** + -2x ➔ $3x$ to simplify the equation
	$+8 \qquad +8$	**Added** 8 to **1** and **$3x + -8$** to get the term with the variable by itself
	$9 = 3x$	**Removed Zero Pairs** **1** + 8 ➔ 9 and **-8** + 8 ➔ 0 to simplify the equation
	$\dfrac{}{3} \quad \dfrac{}{3}$	**Divided** **9** and **$3x$** by 3 to get the variable by itself
	$3 = x$	**Simplified** **9** ÷ 3 ➔ 3 and **$3x$** ÷ 3 ➔ x to find the solution to the equation

Name _____ Date _____

Learning Target: I will solve multi-step linear equations   Algebra 1 – Readiness Standard 1 – 8.EE.7b

Readiness for solving systems of linear equations

Session 2: Guided Practice (Teacher Notes – Cont.)

2. Below are steps to find the solution to the equation $4(x - 2) = 2x - 4$.
For each solution step, discuss what happened and fill in the missing information.

Draw	Write	Describe
	$4(x - 2) = 2x - 4$	➔ can be read as *"Became" or "Changed To"*
	$4(x + \text{-}2) = 2x + \text{-}4$	**Changed subtraction to "add the opposite"** $4(x - 2)$ ➔ **4(x + -2)** and $2x - 4$ ➔ **2x + -4** to model the equation with algebra tiles
	$4x + \text{-}8 = 2x + \text{-}4$	**Multiplied** $4 \cdot \underline{x}$ ➔ **4x** and $4 \cdot \underline{\text{-}2}$ ➔ **-8** to eliminate the parentheses
	$\underline{\text{-}2x \qquad\qquad \text{-}2x}$	**Added** $\text{-}2x$ to **4x + -8** and **2x + -4** to get the terms with the variable on one side of the equal sign
	$2x + \text{-}8 = \text{-}4$	**Removed Zero Pairs** $\underline{4x} + \text{-}2x$ ➔ $2x$ and $\underline{2x} + \text{-}2x$ ➔ 0 to simplify the equation
	$\underline{+8 \qquad +8}$	**Added** 8 to **2x + -8** and **-4** to get the term with the variable by itself
	$2x = 4$	**Removed Zero Pairs** $\underline{\text{-}8} + 8$ ➔ 0 and $\underline{\text{-}4} + 8$ ➔ 4 to simplify the equation
	$\dfrac{}{2} \quad \dfrac{}{2}$ $x = 2$	**Divided** $\underline{2x}$ and $\underline{4}$ by 2 to get the variable by itself **Simplified** $\underline{2x} \div 2$ ➔ x and $\underline{4} \div 2$ ➔ 2 to find the solution to the equation

Session 2: Self-Reflection

Learning Target: I will solve multi-step linear equations

Briefly discuss student responses

> ➤ What did I learn today about solving multi-step linear equations?

> ➤ How confident do I feel about solving multi-step linear equations
>
> on my own?
>
> *(Thumbs up, down, or sideways)*

Name_____ Date_____

Learning Target: I will solve multi-step linear equations.

Directions: Answer each question and show your work. (Work time: 5 minutes)

1.

What value of x makes the equation below true?

$$2x + 15 = 8x - 9$$

2.

What is the solution to the equation below?

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

3.

What value of x makes the following true?

$2(5x - 4) = 3x + 13$

4.

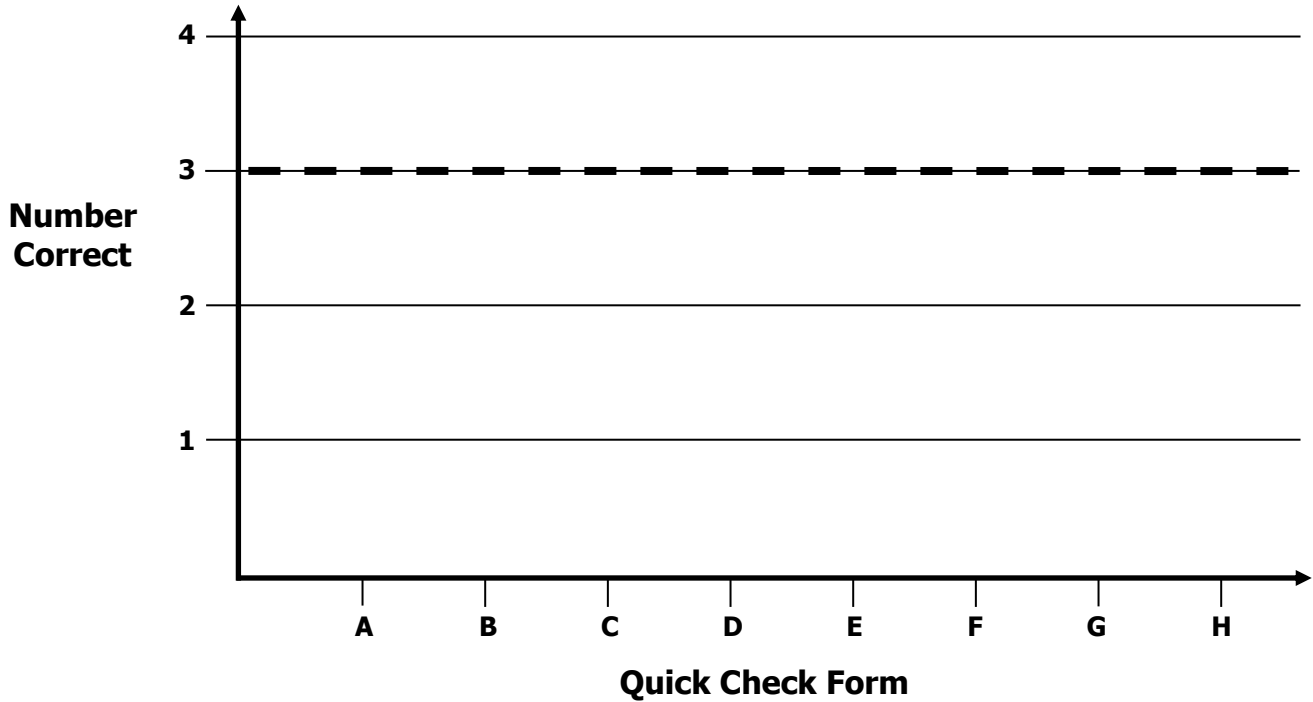What is the solution to the equation below?

$2(4x + 1) = 3(x - 6)$

Algebra 1 Growth Chart

Readiness Standard 1 - 8.EE.7b

Name_____

Learning Target: I will solve multi-step linear equations.

Goal: 3 out of 4 correct

Intervention	Date	Score
Session 1:		
Session 2:		
Session 3:		
Session 4:		
Session 5:		
Session 6:		
Session 7:		
Session 8:		

Learning Target: I will solve multi-step linear equations Algebra 1 – Readiness Standard 1 – 8.EE.7b

Readiness for solving systems of linear equations

Session 3: Guided Practice (Whole Group)

Directions: Below are steps to find the solution to each equation.
For each solution step, discuss what happened and fill in the missing information.

Write	Describe
1. $3x + 2 = 5x - 6$	
$3x + 2 = 5x + \text{-}6$ <u>-3x -3x</u>	**Changed to Addition** $5x - 6$ ➔ _____ + _____ to make it easier to combine like terms
$2 = 2x + \text{-}6$ <u>+6 +6</u>	**Added** _____ + _____ ➔ 0 and _____ + _____ ➔ $2x$ to get the terms with the variable on one side of the equal sign
$\dfrac{8}{2} = \dfrac{2x}{2}$	**Added** _____ + _____ ➔ 8 and _____ + _____ ➔ 0 to get the term with the variable by itself
$4 = x$	**Divided** _____ ÷ _____ ➔ 4 and _____ ÷ _____ ➔ x to find the solution to the equation
2. $3(x + 2) = 5x - 6$	
$3(x + 2) = 5x + \text{-}6$	**Changed to Addition** $5x - 6$ ➔ _____ + _____ to make it easier to combine like terms
$3x + 6 = 5x + \text{-}6$ <u>-3x -3x</u>	**Multiplied** 3 • _____ ➔ _____ and 3 • _____ ➔ _____ to eliminate the parentheses
$6 = 2x + \text{-}6$ <u>+6 +6</u>	**Added** _____ + _____ ➔ 0 and _____ + _____ ➔ $2x$ to get the terms with the variable on one side of the equal sign
$\dfrac{12}{2} = \dfrac{2x}{2}$	**Added** _____ + _____ ➔ 12 and _____ + _____ ➔ 0 to get the term with the variable by itself
$6 = x$	**Divided** _____ ÷ _____ ➔ 6 and _____ ÷ _____ ➔ x to find the solution to the equation

DELTA MATH

Session 3: Guided Practice (Pairs)

Directions: Solve each linear equation.

3. $\qquad 4x - 1 = x + 8$ $\qquad 4x + \text{-}1 = x + 8$ $\qquad 3x + \text{-}1 = \underline{\qquad}$ $\qquad\qquad 3x = \underline{\qquad}$ $\qquad\qquad\ x = \underline{\qquad}$	**4.** $\qquad 3x - 4 = 5x - 12$ $\qquad 3x + \text{-}4 = 5x + \underline{\qquad}$ $\qquad\quad \text{-}4 = \underline{\qquad} + \underline{\qquad}$ $\qquad\qquad\ x = \underline{\qquad}$
5. $\qquad 3(2x - 7) = x + 9$ $\qquad 3(2x + \underline{\qquad}) = x + 9$ $3 \bullet 2x + 3 \bullet \underline{\qquad} = x + 9$ $\qquad\qquad\qquad x = \underline{\qquad}$	**6.** $\qquad 2x - 4 = 6(x - 4)$ $\qquad 2x + \text{-}4 = 6(x + \underline{\qquad})$ $2x + \text{-}4 = 6 \bullet x + \underline{\qquad} \bullet \underline{\qquad}$ $\qquad\qquad\qquad x = \underline{\qquad}$
7. $\qquad 2(7x + 1) = 3(x + 8)$ $\qquad\qquad\qquad x = \underline{\qquad}$	**8.** $\qquad 2(x + 9) = 5(2x - 6)$ $\qquad\qquad\qquad x = \underline{\qquad}$

Learning Target: I will solve multi-step linear equations   Algebra 1 – Readiness Standard 1 – 8.EE.7b

Readiness for solving systems of linear equations

Session 3: Guided Practice (Teacher Notes)

Directions: Below are steps to find the solution each equation.
For each solution step, discuss what happened and fill in the missing information.

Write	Describe
1. $\quad 3x + 2 = 5x - 6$	➔ can be read as *"Became" or "Changed To"*
$3x + 2 = 5x + \text{-}6$ $\underline{\text{-}3x \qquad\qquad \text{-}3x}$	**Changed to Addition** $5x - 6$ ➔ **$\underline{5x}$ + $\underline{\text{-}6}$** to make it easier to combine like terms
$2 = 2x + \text{-}6$ $\underline{+6 \qquad\qquad +6}$	**Added** $\underline{3x} + \underline{\text{-}3x}$ ➔ 0 and $\underline{5x} + \underline{\text{-}3x}$ ➔ $2x$ to get the terms with the variable on one side of the equal sign
$\dfrac{8}{2} = \dfrac{2x}{2}$	**Added** $\underline{2} + \underline{6}$ ➔ 8 and $\underline{\text{-}6} + \underline{6}$ ➔ 0 to get the term with the variable by itself
$4 = x$	**Divided** $\underline{8} \div \underline{2}$ ➔ 4 and $\underline{2x} \div \underline{2}$ ➔ x to find the solution to the equation
2. $\quad 3(x + 2) = 5x - 6$	
$3(x + 2) = 5x + \text{-}6$	**Changed to Addition** $5x - 6$ ➔ **$\underline{5x}$ + $\underline{\text{-}6}$** to make it easier to combine like terms
$3x + 6 = 5x + \text{-}6$ $\underline{\text{-}3x \qquad\qquad \text{-}3x}$	**Multiplied** $3 \bullet \underline{x}$ ➔ $\underline{3x}$ and $3 \bullet \underline{2}$ ➔ $\underline{6}$ to eliminate the parentheses
$6 = 2x + \text{-}6$ $\underline{+6 \qquad\qquad +6}$	**Added** $\underline{3x} + \underline{\text{-}3x}$ ➔ 0 and $\underline{5x} + \underline{\text{-}3x}$ ➔ $2x$ to get the terms with the variable on one side of the equal sign
$\dfrac{12}{2} = \dfrac{2x}{2}$	**Added** $\underline{6} + \underline{6}$ ➔ 12 and $\underline{\text{-}6} + \underline{6}$ ➔ 0 to get the term with the variable by itself
$6 = x$	**Divided** $\underline{12} \div \underline{2}$ ➔ 6 and $\underline{2x} \div \underline{2}$ ➔ x to find the solution to the equation

Algebra 1 – Readiness Standard 1 – 8.EE.7b   24

Learning Target: I will solve multi-step linear equations

Briefly discuss student responses

➢ What did I learn today about solving multi-step linear equations?

➢ How confident do I feel about solving multi-step linear equations on my own?

(Thumbs up, down, or sideways)

Algebra 1 Quick Check – Form B

Readiness Standard 1 - 8.EE.7b

Name_____ Date_____

Learning Target: I will solve multi-step linear equations.

Directions: Answer each question and show your work. (Work time: 5 minutes)

1.

What value of x makes the equation below true?

$$3x - 6 = 8x + 9$$

2.

What is the solution to the equation below?

$$3(x + 2) = 5x - 6$$

3.

What value of x makes the following true?

$2(4x - 6) = 2x + 12$

4.

What is the solution to the equation below?

$4(3x + 6) = 3(x - 7)$

Learning Target: I will solve multi-step linear equations   Algebra 1 – Readiness Standard 1 – 8.EE.7b

Readiness for solving systems of linear equations

Session 4: Guided Practice (Whole Group)

Directions: Below are steps to find the solution each equation.
            For each solution step, discuss what happened and fill in the missing information.

Write	Describe
1. $3x + 6 = 5x - 4$	
$3x + 6 = 5x + $ -4 $\underline{-3x \qquad\qquad -3x}$	**Changed to Addition** $5x - 4$ ➔ _____ + _____ to make it easier to combine like terms
$6 = 2x + $ -4 $\underline{+4 \qquad\qquad +4}$	**Added** _____ + _____ ➔ 0 and _____ + _____ ➔ $2x$ to get the terms with the variable on one side of the equal sign
$\dfrac{10}{2} = \dfrac{2x}{2}$	**Added** _____ + _____ ➔ 10 and _____ + _____ ➔ 0 to get the term with the variable by itself
$5 = x$	**Divided** _____ ÷ _____ ➔ 5 and _____ ÷ _____ ➔ x to find the solution to the equation
2. $7x + 3 = 2(x - 6)$	
$7x + 3 = 2(x + $ -6$)$	**Changed to Addition** $2(x - 6)$ ➔ $2($_____ + _____$)$ to make it easier to combine like terms
$7x + 3 = 2x + $ -12 $\underline{-2x \qquad\qquad -2x}$	**Multiplied** 2 • _____ ➔ _____ and 2 • _____ ➔ _____ to eliminate the parentheses
$5x + 3 = $ -12 $\underline{-3 \qquad -3}$	**Added** _____ + _____ ➔ $5x$ and _____ + _____ ➔ 0 to get the terms with the variable on one side of the equal sign
$\dfrac{5x}{5} = \dfrac{-15}{5}$	**Added** _____ + _____ ➔ 0 and _____ + _____ ➔ -15 to get the term with the variable by itself
$x = $ -3	**Divided** _____ ÷ _____ ➔ x and _____ ÷ _____ ➔ -3 to find the solution to the equation

Learning Target: I will solve multi-step linear equations   Algebra 1 – Readiness Standard 1 – 8.EE.7b

Session 4: Guided Practice (Pairs)

Directions: Solve each linear equation.

3. $3x - 5 = x + 9$	**4.** $4x - 7 = 7x + 8$
5. $3(4x - 9) = x + 6$	**6.** $3x - 6 = 6(x - 3)$
7. $2(5x + 6) = 6(x - 2)$	**8.** $2(x + 9) = 7(2x - 6)$

Learning Target: I will solve multi-step linear equations

Algebra 1 – Readiness Standard 1 – 8.EE.7b

Readiness for solving systems of linear equations

Session 4: Guided Practice (Teacher Notes)

Directions: Below are steps to find the solution each equation.
For each solution step, discuss what happened and fill in the missing information.

Write	Describe
1. $3x + 6 = 5x - 4$	➔ can be read as *"Became" or "Changed To"*
$3x + 6 = 5x + \text{-}4$	**Changed to Addition** $5x - 4$ ➔ **$\underline{5x} + \underline{\text{-}4}$** to make it easier to combine like terms
$\underline{\text{-}3x \qquad\qquad \text{-}3x}$	
$6 = 2x + \text{-}4$	**Added** $\underline{3x} + \underline{\text{-}3x}$ ➔ 0 and $\underline{5x} + \underline{\text{-}3x}$ ➔ $2x$ to get the terms with the variable on one side of the equal sign
$\underline{+4 \qquad\qquad +4}$	
$\dfrac{10}{2} = \dfrac{2x}{2}$	**Added** $\underline{6} + \underline{4}$ ➔ 10 and $\underline{\text{-}4} + \underline{4}$ ➔ 0 to get the term with the variable by itself
$5 = x$	**Divided** $\underline{10} \div \underline{2}$ ➔ 5 and $\underline{2x} \div \underline{2}$ ➔ x to find the solution to the equation
2. $7x + 3 = 2(x - 6)$	
$7x + 3 = 2(x + \text{-}6)$	**Changed to Addition** $2(x - 6)$ ➔ $2(\underline{x} + \underline{\text{-}6})$ to make it easier to combine like terms
$7x + 3 = 2x + \text{-}12$	**Multiplied** $\underline{2} \cdot \underline{x}$ ➔ $2x$ and $\underline{2} \cdot \underline{\text{-}6}$ ➔ -12 to eliminate the parentheses
$\underline{\text{-}2x \qquad\qquad \text{-}2x}$	
$5x + 3 = \text{-}12$	**Added** $\underline{7x} + \underline{\text{-}2x}$ ➔ $5x$ and $\underline{2x} + \underline{\text{-}2x}$ ➔ 0 to get the terms with the variable on one side of the equal sign
$\underline{\text{-}3 \qquad\;\; \text{-}3}$	
$\dfrac{5x}{5} = \dfrac{\text{-}15}{5}$	**Added** $\underline{3} + \underline{\text{-}3}$ ➔ 0 and $\underline{\text{-}12} + \underline{\text{-}3}$ ➔ -15 to get the term with the variable by itself
$x = \text{-}3$	**Divided** $\underline{5x} \div \underline{5}$ ➔ x and $\underline{\text{-}15} \div \underline{5}$ ➔ -3 to find the solution to the equation

Session 4: Self-Reflection

Algebra 1 – Readiness Standard 1 – 8.EE.7b

Learning Target: I will solve multi-step linear equations

Briefly discuss student responses

➢ What did I learn today about solving multi-step linear equations?

➢ How confident do I feel about solving multi-step linear equations
on my own?
(Thumbs up, down, or sideways)

Name_____ Date_____

Learning Target: I will solve multi-step linear equations.

Directions: Answer each question and show your work. (Work time: 5 minutes)

1.

What value of x makes the equation below true?

$$2x + 6 = 6x - 10$$

2.

What is the solution to the equation below?

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

3.

What value of x makes the following true?

$4(3x + 1) = 3x - 14$

4.

What is the solution to the equation below?

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

Name_____ Date_____

Learning Target: I will solve multi-step linear equations.

Directions: Answer each question and show your work. (Work time: 5 minutes)

1.

What value of x makes the equation below true?

$$2x - 10 = 5x + 2$$

2.

What is the solution to the equation below?

$$3(x - 3) = x + 7$$

3.

What value of x makes the following true?

$4(2x - 6) = 3x + 11$

4.

What is the solution to the equation below?

$2(3x + 1) = 4(x - 2)$

Name_____ Date_____

Learning Target: I will solve multi-step linear equations.

Directions: Answer each question and show your work. (Work time: 5 minutes)

1.

What value of x makes the equation below true?

$$2x + 15 = 8x - 9$$

2.

What is the solution to the equation below?

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

3.

What value of x makes the following true?

$2(5x - 4) = 3x + 13$

4.

What is the solution to the equation below?

$2(4x + 1) = 3(x - 6)$

Name_____ Date_____

Learning Target: I will solve multi-step linear equations.

Directions: Answer each question and show your work. (Work time: 5 minutes)

1.

What value of x makes the equation below true?

$$3x - 6 = 8x + 9$$

2.

What is the solution to the equation below?

$$3(x + 2) = 5x - 6$$

3.

What value of x makes the following true?

$$2(4x - 6) = 2x + 12$$

4.

What is the solution to the equation below?

$$4(3x + 6) = 3(x - 7)$$

DELTA MATH — RtI PROGRAM

Name_____ Date_____

Learning Target: I will solve multi-step linear equations.

Directions: Answer each question and show your work. (Work time: 5 minutes)

1.

What value of x makes the equation below true?

$$2x + 6 = 6x - 10$$

2.

What is the solution to the equation below?

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

3.

What value of x makes the following true?

$4(3x + 1) = 3x - 14$

4.

What is the solution to the equation below?

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

Name_____ Date_____

Learning Target: I will solve multi-step linear equations.

Directions: Answer each question and show your work. (Work time: 5 minutes)

1.

What value of x makes the equation below true?

$$2x - 10 = 5x + 2$$

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What is the solution to the equation below?

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What value of x makes the following true?

$4(2x - 6) = 3x + 11$

4.

What is the solution to the equation below?

$2(3x + 1) = 4(x - 2)$