7ᵗʰ Grade
Tier 2 Intervention Lessons

Readiness Standard 6 – 6.EE.7

Learning Target: I will solve 1-step equations

Readiness for 7.EE.4a: Solve equations with more than one step

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IES Recommendations for Tier 2 and 3 intervention lessons:

2. Instructional materials for students receiving interventions should focus intensely on in-depth treatment of whole numbers in kindergarten through grade 5 and on rational numbers in grades 4 through 8. These materials should be selected by committee.	**Low**
3. Instruction during the intervention should be explicit and systematic. This includes providing models of proficient problem solving, verbalization of thought processes, guided practice, corrective feedback, and frequent cumulative review.	**Strong**
4. Interventions should include instruction on solving word problems that is based on common underlying structures.	**Strong**
5. Intervention materials should include opportunities for students to work with visual representations of mathematical ideas and interventionists should be proficient in the use of visual representations of mathematical ideas.	**Moderate**
6. Interventions at all grade levels should devote about 10 minutes in each session to building fluent retrieval of basic arithmetic facts.	**Moderate**
7. Monitor the progress of students receiving supplemental instruction and other students who are at risk.	**Low**
8. Include motivational strategies in tier 2 and tier 3 interventions.	**Low**

(Institute of Educational Sciences, Assisting Students Struggling with Mathematics: Response to Intervention (RtI) for Elementary and Middle Schools, 2009, p. 6)

Gradual release of responsibility model
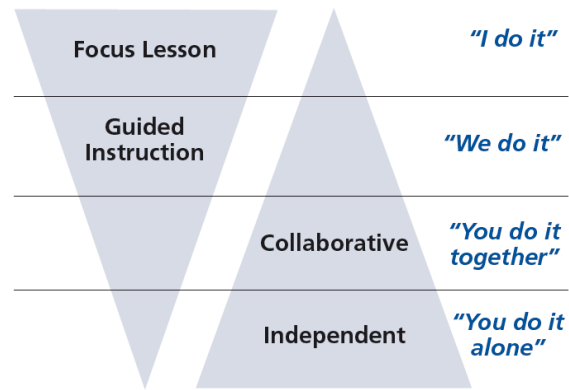

Figure 1

(Dr. Douglas Fisher, Effective Use of the Gradual Release of Responsibility Model)

Planning Guide: Session 1

7th Grade – Readiness Standard 6 – 6.EE.7

Learning Target: I will solve 1-step equations

Readiness for solving equations with more than one step

Recommended Actions	

Beginning
(15 min.)
	<u>Review</u> the readiness standard with the intervention group using the **Guided Review**
	
	    o Introduce the learning target and why it is important for future learning
	
	    o Read each question on the Guided Review and ask students to share what they remember from the previous school year.

Middle
(5 min.)
	➤ Ask students to <u>reflect</u> on their progress towards the learning target
	
	    o What did I remember about the learning target?
	
	    o What did I learn today about the learning target?
	
	    o How confident do I feel about doing the learning target on my own?

End *(10 min.)*	➤ <u>Assess</u> each student's progress using **Quick Check – Form A** ➤ Guide students to self-correct their **Quick Check – Form A** ➤ Guide students to <u>chart their progress</u> by recording the date and Quick Check score in their **Growth Chart** ➤ Collect each student's Quick Check and Growth Chart

After	➤ Create sub-groups to differentiate the middle of sessions 2 through 8
	
	    o Group 1 – Include students who <u>did not</u> meet the learning goal
	
	    o Group 2 – Include students who met or exceeded the learning goal

7th Grade Fall Guided Review

Readiness Standard 6 - 6.EE.7

Name_____ Date_____

Learning Target: I will solve 1-step equations.

1.

Solve the equation for *x*.

$$x + 4 = 12$$

○ 3   ○ 8   ○ 16   ○ 48

2.

Solve the equation for *x*.

$$12 = 3x$$

○ 4   ○ 15   ○ 9   ○ 36

3.

Solve the equation for *x*.

$$\frac{1}{3}x = 6$$

○ 2   ○ 3   ○ 9   ○ 18

7th Grade Winter Guided Review

Readiness Standard 6 - 6.EE.7

Name_____ Date_____

Learning Target: I will solve 1-step equations.

1.

Solve the equation for *x*.

$$x + 5 = 10$$

○ 2   ○ 15   ○ 5   ○ 50

2.

Solve the equation for *x*.

$$24 = 4x$$

○ 96   ○ 20   ○ 28   ○ 6

3.

Solve the equation for *x*.

$$\frac{1}{4}x = 8$$

○ 32   ○ 12   ○ 4   ○ 2

Name_____ Date_____

Learning Target: I will solve 1-step equations.

1.

Solve the equation for *x*.

$$x + 3 = 12$$

○ 36 ○ 15 ○ 4 ○ 9

2.

Solve the equation for *x*.

$$35 = 5x$$

○ 7 ○ 40 ○ 30 ○ 175

3.

Solve the equation for *x*.

$$\frac{1}{2}x = 6$$

○ 3 ○ 4 ○ 8 ○ 12

Learning Target: I will solve 1-step equations

Briefly discuss student responses

> What did I remember about solving 1-step equations?

> What did I learn today about solving 1-step equations?

> How confident do I feel about solving 1-step equations on my own? *(Thumbs up, down, or sideways)*

Quick Check - Form A

7th Grade – Readiness Standard 6 – 6.EE.7

Name_____ Date_____

Learning Target: I will solve 1-step equations.

Directions: Solve each equation for *x*. (Work time: 4 minutes)

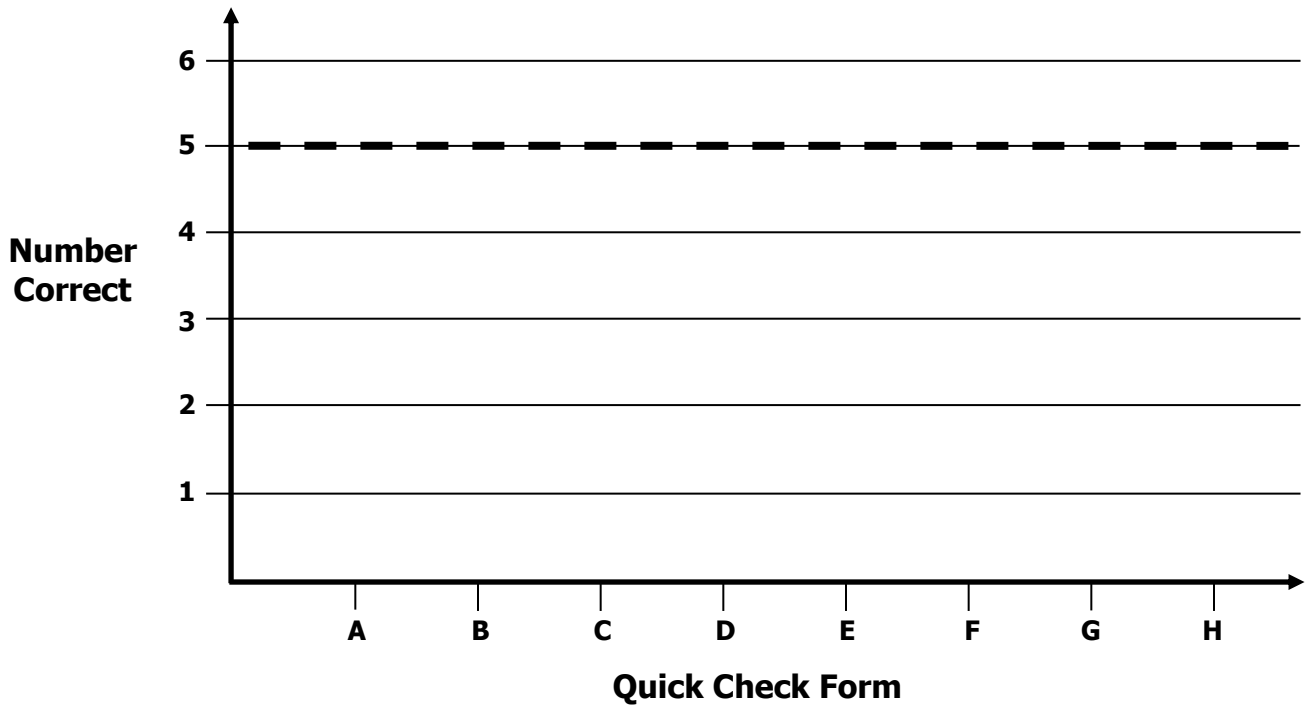|	
1. $x + 6 = 12$	**2.** $x + 3\frac{1}{2} = 9$
3. $4x = 20$	**4.** $\frac{1}{4}x = 6$
5. $x + 2\frac{3}{4} = 7$	**6.** $\frac{2}{3}x = 8$

Growth Chart

7th Grade – Readiness Standard 6 – 6.EE.7

Name_____ Date_____

Learning Target: I will solve 1-step equations.

Goal: 5 out of 6 correct

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

Planning Guide: Sessions 2 Through 8

7th Grade – Readiness Standard 6 – 6.EE.7

Learning Target: I will solve 1-step equations

Readiness for solving equations with more than one step

	Recommended Actions	
Beginning (5 min.)	➢ Review the learning target with the whole group and ask each student to set a goal.	
Middle (15 min.)	**Group 1:** Students who scored below the learning goal on the previous Quick Check. ➢ Model solving a word problem – "I do" ➢ Guided Practice – "We do" **Session 2:** Solve 1-step equations (+ and x) with whole numbers using algebra tiles. **Session 3:** Solve 1-step equations (+ and x) with whole numbers using drawings. **Session 4:** Solve 1-step equations (x) with whole numbers and fractions using drawings. **Session 5:** Solve 1-step equations (+ and x) with whole numbers and fractions using inverse operations.	**Group 2:** *(Students who met the learning goal)* ➢ Independent practice – "You do alone" **Activity 1:** *"Solve 1-step Equations Match-up"* *(Look for additional activities in 6th grade core instruction resources.)*

End (10 min.)	➢ Bring the students back together.
	 ➢ Ask students to reflect on their progress towards the learning target
	    ○ What did I learn today about solving 1-step equations?
	    ○ How confident do you feel about solving 1-step equations on my own? (Thumbs up, down, or sideways)
	 ➢ Assess each student's progress using the next **Quick Check** form
	 ➢ Guide students to self-correct their **Quick Check**
	 ➢ Guide students to chart their progress in their **Growth Chart**
	    ○ If not using Delta Math lessons, record the activity in the table
	 ➢ Collect each student's **Quick Check** and **Growth Chart**	

After	➢ Regroup students to differentiate the middle of sessions 3 through 8
	    ○ Promote students who met the learning goal to group 2
	    ○ Exit students who met the learning goal for a third time
	 ➢ Problem solve with a team to plan additional support for students who did not exit	

Learning Target: I will solve 1-step equations

Readiness for solving equations with more than one step

Greg had a mystery number of dollars before earning $5 for mowing the lawn. Now, he has 9 dollars. The equation $x + 5 = 9$ dollars can be used to represent how much he had, how much he earned and how much he has now. How much money did Greg have before mowing the lawn?

DELTA MATH Rtl PROGRAM

Learning Target: I will solve 1-step equations

Readiness for solving equations with more than one step

Greg had a mystery number of dollars before earning $5 for mowing the lawn. Now, he has 9 dollars. The equation $x + 5 = 9$ dollars can be used to represent how much he had, how much he earned and how much he has now. How much money did Greg have before mowing the lawn?

Step 1: Write the equation

Starting Amount + Earned for Mowing = Total

$$x + 5 = 9$$

Step 2: Build each equivalent expression

| +x | +1 +1 +1 +1 +1 | ‖ | +1 +1 +1 +1 +1 / +1 +1 +1 +1 |

Step 3: Find the value of x by taking away equal values from both expressions

5 tiles were removed   5 tiles were removed

| +x | +1 +1 +1 +1 +1 | ‖ | +1 +1 +1 +1 +1 / +1 +1 +1 +1 |

Solution

| +x | | ‖ | +1 +1 +1 +1 |

$$x = 4$$

Note: Color-coding is provided to help the interventionist make connections between the numbers, symbols and pictures. It may also help students who struggle to make similar connections.

Session 2: Modeling *(I Do - Teacher Notes)*

7th Grade – Readiness Standard 6 – 6.EE.7

Learning Target: I will solve 1-step equations   **Readiness** for solving equations with more than one step

> Greg had a mystery number of dollars before earning $5 for mowing the lawn. Now, he has 9 dollars. The equation $x + 5 = 9$ dollars can be used to represent how much he had, how much he earned and how much he has now. How much money did Greg have before mowing the lawn?

I am going to think aloud to model solving this problem.

Your job is to watch, listen, think and ask questions.

First, it is important to know what the problem is about.

The problem is about Greg's money.

Second, I need to determine what I need to find.

I need to find how much money Greg had before mowing the lawn.

Third, I need to determine what I know.

I know Greg started with an unknown amount, earned $5 for mowing and now he has a total of 9 dollars.
(Write "Starting Amount + Earned for Mowing = Total".)

I also know that this situation can be modeled by the equation $x + 5 = 9$. (Write "$x + 5 = 9$" below the headings.)

Fourth, I need to figure out what I can try.

I will use algebra tiles to represent this situation.

I need to use an "$+x$ tile" and 5 "+1 tiles" to represent the expression $x + 5$.
(Place 1 "+x tile" and 5 "+1 tiles" below the equation.)

Next, I need to place 9 "+1 tiles" to represent the total.
(Place 9 "+x tiles" below the total in the equation.)

Since the 5 "+1 tiles" on the left are equal to the 5 "+1 tiles" on the right, I can remove 5 "+1 tiles" on both sides knowing the both sides remain equal to each other.
(Remove 5 "+1 tiles" from both sides of the equal sign.)

The remaining tiles show that x is definitely equal to 4 since I see 1 "+x tile" on the left and 4 "+1 tiles" on the right. (Point to the remaining tiles on each side of the 2 vertical lines.)

Last, I need to make sure that my answer makes sense.

I found that Greg had 4 dollars before mowing the lawn. This makes sense because I modeled the situation using algebra tiles to represent the given equation.
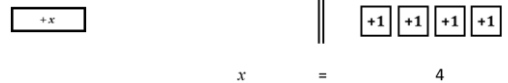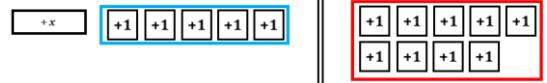
Learning Target: I will solve 1-step equations

Session 2: Guided Practice (We Do)

Materials:

➢ Algebra Tiles (20 +1's and 10 +x's per student)

➢ Equation mat (1 per student)

We Do Together: (Teacher Actions)

➢ Translate the equation into a phrase with meaning. Then, use algebra tiles to find the solution.

1. $x + 4 = 6$	**2.** $3x = 12$
3. $4x = 8$	**4.** $x + 3 = 11$

Learning Target: I will solve 1-step equations
<div align="right">7th Grade - RS 6 - 6.EE.7</div>

Session 2: Guided Practice (We Do - Continued)

You Do Together: (As a class, or in small groups)

➢ Students take turns leading to solve each 1-step equation.

5. $x + 5 = 8$	**6.** $2x = 10$
7. $x + 6 = 10$	**8.** $4x = 12$
9. $3x = 15$	**10.** $x + 4 = 12$

Learning Target: I will solve 1-step equations   7th Grade - RS 6 - 6.EE.7

Session 2: Guided Practice (We Do – Teacher Notes)

Materials:

➢ Algebra Tiles (1 set on p. 13: 20 +1s and 16 +x's per student)

➢ Equation mat (1 per student)

We Do Together: (Teacher Actions)

➢ Translate the equation into a phrase with meaning. Then, use algebra tiles to find the solution.

---

1. *What number plus 4 is equal to 6?*

$$x + 4 = 6$$

Equation Mat

| +x | | +1 | +1 |

Build x + 4 = 6 by arranging the 6 in a ten-frame format.
Then, take away 4 "+1 tiles" from both sides.

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2. *3 times what number is equal to 12?*

$$3x = 12$$

Equation Mat

| +x | | +1 | +1 | +1 | +1 |

Cover Paper ➤

Build 3x = 12 by arranging the 12 in a ten-frame format.
Align the 12 "+1 tiles" in equal groups to find the value of each "+x tile"
Cover up 2 "+x tiles" and their corresponding "+1 tiles" to show the value of x.

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3. *4 times what number is equal to 8?*

$$4x = 8$$

Equation Mat

| +x | | +1 | +1 |

Cover Paper ➤

Build 4x = 8 by arranging the 8 in a ten-frame format.
Align the 8 "+1 tiles" in equal groups to find the value of each "+x tile"
Cover up 3 "+x tiles" and their corresponding "+1 tiles" to show the value of x.

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4. *What number plus 3 is equal to 11?*

$$x + 3 = 11$$

Equation Mat

| +x | | +1 | +1 | +1 | +1 | +1 |
| | | +1 | +1 | +1 | | |

Build x + 3 = 11 by arranging the 11 in a ten-frame format.
Then, take away 3 "+1 tiles" from both sides.

Algebra Tiles (2 sets of positive tiles)

7th Grade - Readiness Standards 3, 4, 5 and 6 – 6.EE.2a, 6.EE.2c, 6.EE.4, 6.EE.7

Directions: Provide each student one set of positive tiles.

Note: $+x^2$ tiles are included, but will not be used the lessons for 6.EE.2a and 6.EE.7

+1	+1	+1	+1	+1	$+x$	$+x$	$+x$	$+x$
+1	+1	+1	+1	+1	$+x$	$+x$	$+x$	$+x$
+1	+1	+1	+1	+1	$+x$	$+x$	$+x$	$+x$
+1	+1	+1	+1	+1	$+x$	$+x$	$+x$	$+x$

$+x^2$	$+x^2$	$+x^2$	$+x^2$	$+x^2$	$+x^2$
$+x^2$	$+x^2$	$+x^2$	$+x^2$	$+x^2$	$+x^2$

+1	+1	+1	+1	+1	$+x$	$+x$	$+x$	$+x$
+1	+1	+1	+1	+1	$+x$	$+x$	$+x$	$+x$
+1	+1	+1	+1	+1	$+x$	$+x$	$+x$	$+x$
+1	+1	+1	+1	+1	$+x$	$+x$	$+x$	$+x$

$+x^2$	$+x^2$	$+x^2$	$+x^2$	$+x^2$	$+x^2$
$+x^2$	$+x^2$	$+x^2$	$+x^2$	$+x^2$	$+x^2$

Modeling & Guided Practice Cards

7th Grade – Readiness Standard 6 – 6.EE.7

Use for Problem 1	Use for Problem 2
$x + 4 = 6$	$3x = 12$

Use for Problem 3	Use for Problem 4
$4x = 8$	$x + 3 = 11$

Use for Problem 5	Use for Problem 6
$x + 5 = 8$	$2x = 10$

Use for Problem 7	Use for Problem 8
$x + 6 = 10$	$4x = 12$

Use for Problem 9	Use for Problem 10
$3x = 15$	$x + 4 = 12$

Use for Modelling	
$x + 5 = 9$	

Learning Target: I will solve 1-step equations

Briefly discuss student responses

➤ What did I learn today about solving 1-step equations?

➤ How confident do I feel about solving 1-step equations on my own? *(Thumbs up, down, or sideways)*

Quick Check - Form B

Name_____ Date_____

Learning Target: I will solve 1-step equations.

Directions: Solve each equation for *x*. (Work time: 4 minutes)

1. $x + 4 = 16$	**2.** $x + 2\frac{1}{3} = 4$
3. $3x = 15$	**4.** $\frac{1}{4}x = 2$
5. $x + 3\frac{2}{5} = 8$	**6.** $\frac{3}{4}x = 9$

Learning Target: I will solve 1-step equations

Readiness for solving equations with more than one step

Greg worked very hard and earned all A's on his report card. As a reward, his mom doubled his normal weekend computer gaming time to 8 hours. If x represents the amount of gaming time on a normal weekend, the equation $2x = 8$ can be used to find his normal gaming time. How much time does Greg normally get for weekend gaming?

Learning Target: I will solve 1-step equations

Readiness for solving equations with more than one step

Greg worked very hard and earned all A's on his report card. As a reward, his mom doubled his normal weekend computer gaming time to 8 hours. If x represents the amount of gaming time on a normal weekend, the equation $2x = 8$ can be used to find his normal gaming time. How much time does Greg normally get for weekend gaming?

Doubled Gaming Time   =   Total

$$2x \qquad = \qquad 8$$

$+x$		$+ + + +$
$+x$		$+ + + +$

$$x \qquad = \qquad 4$$

Note: Color-coding is provided to help the interventionist make connections between the numbers, symbols and pictures. It may also help students who struggle to make similar connections.

Session 3: Modeling *(I Do - Teacher Notes)*

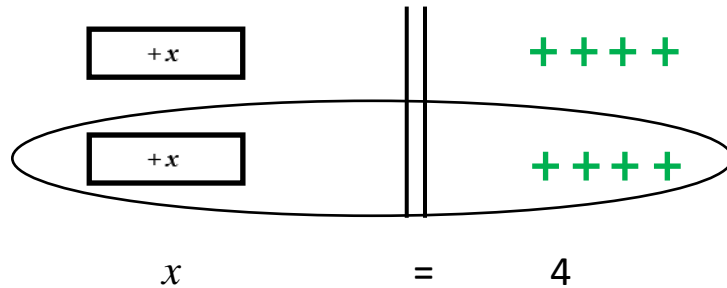7th Grade – Readiness Standard 6 – 6.EE.7

Learning Target: I will solve 1-step equations   **Readiness** for solving equations with more than one step

Greg worked very hard and earned all A's on his report card. As a reward, his mom doubled his normal weekend computer gaming time to 8 hours. If x represents the amount of gaming time on a normal weekend, the equation $2x = 8$ can be used to find his normal gaming time. How much time does Greg normally get for weekend gaming?

I am going to think aloud to model solving this problem.

Your job is to watch, listen, think and ask questions.

First, it is important to know what the problem is about.

The problem is about Greg's weekend gaming time.

Second, I need to determine what I need to find.

I need to find how much time Greg normally gets for weekend gaming.

Third, I need to determine what I know.

I know Greg's mom doubled his normal gaming time and now he has 8 hours.
(Write "Doubled Gaming Time = Total".)

I also know that this situation can be modeled by the equation $2x = 8$.
(Write "2x = 8" below the headings.)

Fourth, I need to figure out what I can try.

I am going to create a math drawing of algebra tiles to represent this situation.

I will draw 2 "+x tiles" to represent the 2x…and 2 vertical lines to represent the equal sign…
(Draw 2 "+x tiles and the 2 vertical lines below the equation.)

Next, I need to draw 8 "plus signs" as 2 equal groups corresponding to both "+x tiles".
(Draw the "plus signs" by alternating between each "+x tile" as you count to 8.)

The math drawing shows that each x is equal to 4 since there are 4 "plus signs" in each group.
(Draw a loop around the bottom "+x tile" and its corresponding "plus signs".)

The drawing shows the solution to 2x = 8 is 4.
(Write the solution "x = 4".)

Doubled Gaming Time = Total

2x   =   8

+x   ++++
+x   ++++

x   =   4
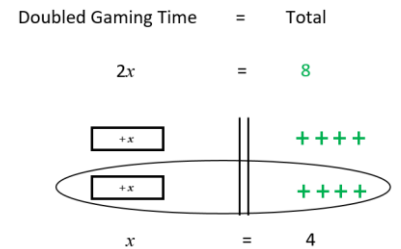
Last, I need to make sure that my answer makes sense.

I found that Greg normally gets 4 hours of gaming time per weekend. This makes sense because I modeled the situation using a math drawing of algebra tiles to represent the given equation.

Session 3: Guided Practice (We Do)

We Do Together: (Teacher Actions)

➢ Translate the equation into a phrase with meaning. Then, use a math drawing to find the solution.

1. $x + 3 = 12$	**2.** $3x = 18$
3. $12 = 4x$	**4.** $13 = 5 + x$

Learning Target: I will solve 1-step equations

7th Grade - RS 6 - 6.EE.7

Session 3: Guided Practice (We Do - Continued)

You Do Together: (As a class, or in small groups)

➢ Students take turns leading to solve each 1-step equation using math drawings.

5. $x + 5 = 8$	**6.** $2x = 10$
7. $10 = x + 6$	**8.** $12 = 4x$
9. $3x = 15$	**10.** $x + 4 = 12$

Learning Target: I will solve 1-step equations

Session 3: Guided Practice (We Do – Teacher Notes)

We Do Together: (Teacher Actions)

➢ Translate the equation into a phrase with meaning. Then, use a math drawing to find the solution.

1. *What number plus 3 is equal to 12?*

$$x + 3 = 12$$

$$x = 12 - 3 = 9$$

Draw x + 3 = 12.
Then, cross out 3 "plus signs" from both sides.

2. *3 times what number is equal to 18?*

$$3x = 18$$

$$x = 18 \div 3 = 6$$

Draw 3x and align the 18 plus signs into 3 equal groups.
Draw a loop around the bottom x and its corresponding plus signs to show the value of x.

3. *12 is equal to 4 times what number?*

$$12 = 4x$$

$$x = 12 \div 4 = 3$$

Draw 4x on the right side and align the 12 plus signs into 4 equal groups.
Draw a loop around the bottom x and its corresponding plus signs to show the value of x.

4. *13 is equal to 5 plus what number?*

$$13 = 5 + x$$

$$x = 13 - 5 = 8$$

Draw 13 = 5 + x.
Then, cross out 5 "plus signs" from both sides.

Learning Target: I will solve 1-step equations

Briefly discuss student responses

> ➢ What did I learn today about solving 1-step equations?

> ➢ How confident do I feel about solving 1-step equations on my own? *(Thumbs up, down, or sideways)*

Quick Check - Form C

7th Grade – Readiness Standard 6 – 6.EE.7

Name_____ Date_____

Learning Target: I will solve 1-step equations.

Directions: Solve each equation for *x*. (Work time: 4 minutes)

1. $x + 5 = 6$	**2.** $x + 2\frac{1}{4} = 9$
3. $6x = 30$	**4.** $\frac{1}{6}x = 3$
5. $x + 4\frac{2}{3} = 7$	**6.** $\frac{2}{5}x = 8$

Learning Target: I will solve 1-step equations

Readiness for solving equations with more than one step

Greg was not able to complete all of his chores. Therefore, he only earned $\frac{1}{4}$ of his allowance, which was $5. If x represents his normal allowance, the equation $\frac{1}{4}x = 5$ can be used to find his normal allowance. How much is Greg's normal allowance?

Session 4: Modeling (I Do – Visual Support)

Learning Target: I will solve 1-step equations

Readiness for solving equations with more than one step

Greg was not able to complete all of his chores. Therefore, he only earned $\frac{1}{4}$ of his allowance, which was $5. If x represents his normal allowance, the equation $\frac{1}{4}x = 5$ can be used to find his normal allowance. How much is Greg's normal allowance?

$\frac{1}{4}$ of Allowance $\qquad$ = Amount Earned

$$\frac{1}{4}x \qquad = \qquad 5$$

+x-tile

$+ + + + +$

$\frac{1}{4}x$	$\frac{1}{4}x$	$\frac{1}{4}x$	$\frac{1}{4}x$
5	5	5	5

+x-tile

$$x = 20$$

Note: Color-coding is provided to help the interventionist make connections between the numbers, symbols and pictures. It may also help students who struggle to make similar connections.

Session 4: Modeling *(I Do - Teacher Notes)*

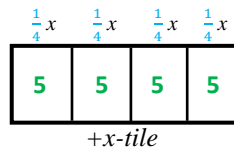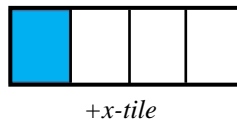7th Grade – Readiness Standard 6 – 6.EE.7

Learning Target: I will solve 1-step equations

Readiness for solving equations with more than one step

> Greg was not able to complete all of his chores. Therefore, he only earned $\frac{1}{4}$ of his allowance, which was $5. If x represents his normal allowance, the equation $\frac{1}{4}x = 5$ can be used to find his normal allowance. How much is Greg's normal allowance?

I am going to think aloud to model solving this problem.

Your job is to watch, listen, think and ask questions.

First, it is important to know what the problem is about.

The problem is about Greg's allowance.

Second, I need to determine what I need to find.

I need to find how much money Greg normally gets.

Third, I need to determine what I know.

I know he only earned $5, which was $\frac{1}{4}$ of his normal allowance.

(Write "$\frac{1}{4}$ of Allowance = Amount Earned".)

I also know that this situation can be modeled by the equation $\frac{1}{4}x = 5$. (Write the equation below the labels.)

Fourth, I need to figure out what I can try.

I am going to use a math drawing to model the situation.

(Draw the +x tile, 2 vertical lines and 5 plus signs under the equation.)

My picture is not accurate yet...I need to represent 1 quarter of x...

(Point to the 1 quarter in the equation.)

So I will separate the +x tile into 4 equal parts and shade 1 fourth of it.

(Draw 3 vertical lines to create fourths...then shade the first section.)

To find his normal monthly allowance, I need to find the value of the whole x.

(Point each of the four sections of the "+x tile".)

In order to make it easier to find the whole, I am going to redraw the x tile with 4 equal parts.

(Draw another x-tile separated into fourths, below the mat drawing.)

Since each part is one-quarter of the whole, I am going to write "¼ x" above each part.

(Write " ¼ x" above each part of the "+x tile".)

The original drawing shows that "¼ x" is equal to 5, so I am going to write "5" in each of the 4 sections.

(Write "5" in the 4 sections of the "+x tile".)

Now I can see that the whole value of x is equal to 20.

(Point to the 4 groups of 5 and write $x = 5 \cdot 4 = 20$ below the math drawing.)

Last, I need to make sure that my answer makes sense.

I found that Greg normally gets $20 for allowance. This makes sense because I modeled the situation using algebra tiles to represent the given equation.

Learning Target: I will solve 1-step equations

Session 4: Guided Practice (We Do)

We Do Together: (Teacher Actions)

➤ Translate the equation into a phrase with meaning. Then, complete the math drawing to find the solution.

1. *"1 third of what number is equal to 7?"*

$$\frac{1}{3}x = 7$$

+x-tile

2.

$$\frac{1}{4}x = 2$$

+x-tile

3.

$$8 = \frac{2}{5}x$$

+x-tile

4.

$$\frac{3}{4}x = 15$$

+x-tile

Session 4: Guided Practice (We Do - Continued)

You Do Together: (As a class, or in small groups)

➢ Students take turns leading to solve each 1-step equation.

5. *"1 fourth of what number is equal to 7?"* $$\frac{1}{4}x = 7$$ +x-tile	**6.** $$\frac{2}{3}x = 6$$ +x-tile
7. $$6 = 3x$$ +x +x +x	**8.** $$\frac{1}{3}x = 6$$ +x-tile
9. $$12 = \frac{3}{5}x$$ +x-tile	**10.** $$4x = 12$$ +x +x +x +x

Learning Target: I will solve 1-step equations

Session 4: Guided Practice (We Do – Teacher Notes)

We Do Together: (Teacher Actions)

- ➢ Translate the equation into a phrase with meaning. Then, complete the math drawing to find the solution.

1. *1 third of what number is equal to 7?* $\frac{1}{3}x = 7$ *+x-tile* $x = 7 \cdot 3 = 21$	**2.** *1 fourth of what number is equal to 3?* $\frac{1}{4}x = 2$ *+x-tile* $x = 2 \cdot 4 = 8$
3. *2 fifths of what number is equal to 8?* $8 = \frac{2}{5}x$ *+x-tile* $8 = \frac{2}{5}x \;\rightarrow\; 4 = \frac{1}{5}x \;\rightarrow\; x = 4 \cdot 5 = 20$	**4.** *3 fourths of what number is equal to 15?* $\frac{3}{4}x = 15$ *+x-tile* $\frac{3}{4}x = 15 \;\rightarrow\; \frac{1}{4}x = 5 \;\rightarrow\; x = 5 \cdot 4 = 20$

Learning Target: I will solve 1-step equations

Briefly discuss student responses

➢ What did I learn today about solving 1-step equations?

➢ How confident do I feel about solving 1-step equations on my own? *(Thumbs up, down, or sideways)*

Quick Check - Form D

7th Grade – Readiness Standard 6 – 6.EE.7

Name_____ Date_____

Learning Target: I will solve 1-step equations.

Directions: Solve each equation for *x*. (Work time: 4 minutes)

1. $x + 9 = 11$	**2.** $x + 4\frac{1}{3} = 6$
3. $2x = 14$	**4.** $\frac{1}{3}x = 8$
5. $x + 1\frac{3}{5} = 9$	**6.** $\frac{2}{3}x = 10$

Session 5: Modeling (I Do)

7th Grade – Readiness Standard 6 – 6.EE.7

Learning Target: I will solve 1-step equations

Readiness for solving equations with more than one step

Greg showed his mom how to solve the equation $\frac{3}{4}x = 15$ using a drawing. His mom appreciated learning a new solution method and said, "when I was your age, we were taught to solve equations using **inverse operations**. We would find the value of x by "undoing" any operations on it. Since x is being multiplied by 3 fourths, we would "undo" multiplication by dividing both sides of the equal sign by 3 fourths…like this…"

Find 1 difference and 1 similarity between the two methods.

Greg's Drawing

$$\frac{3}{4}x = 15$$

| 5 | 5 | 5 | 5 |

+x-tile

$$x = 15 \cdot \frac{4}{3} = 20$$

Greg's Mom's solution using inverse operations

$$\frac{3}{4}x = 15$$

$$\div \frac{3}{4} \qquad \div \frac{3}{4}$$

$$1 \cdot x = \frac{\cancel{3} \cdot 5}{\cancel{15}} \cdot \frac{4}{\cancel{3}}$$

$$x = 20$$

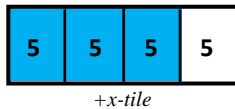**Learning Target:** I will solve 1-step equations

Readiness for solving equations with more than one step

Greg showed his mom how to solve the equation $\frac{3}{4}x = 15$ using a drawing. His mom appreciated learning a new solution method and said, "when I was your age, we were taught to solve equations using **inverse operations**. We would find the value of x by "undoing" any operations on it. Since x is being multiplied by 3 fourths, we would "undo" multiplication by dividing both sides of the equal sign by 3 fourths…like this…"

Find 1 difference and 1 similarity between the two methods.

Greg's Drawing

$\frac{3}{4}x = 15$

5	5	5	5

+x-tile

$x = 15 \cdot \frac{4}{3} = 20$

Greg's Mom's solution using
inverse operations

(Operations that undo each other)

$\frac{3}{4}x = 15$

Undo multiplication by dividing $\div \frac{3}{4} \quad \div \frac{3}{4}$ *Do to one side as you do to the other!*

Any number divided by itself is 1 $1 \cdot x = \frac{\cancel{3} \cdot 5}{\cancel{15}_1} \cdot \frac{4}{\cancel{3}}$ **Use the "multiply by the reciprocal" to divide strategy*

$x = 20$ *Then, multiply after simplifying by the common factor, 3.*

*To divide by a fraction, we can multiply by its reciprocal. (See 7th Grade - RS 1 - 6.NS.1 - Session 4)

Learning Target: I will solve 1-step equations

Readiness for solving equations with more than one step

> …
> Find 1 difference and 1 similarity between the two methods.

I am going to think aloud to model solving this problem.

Your job is to watch, listen, think and ask questions.

First, it is important to know what the problem is about.

The problem is about Greg and his mom solving an equation two different ways.

Second, I need to determine what I need to find.

I need to find 1 difference and 1 similarity between the two solution methods.

Third, I need to determine what I know.

I know that both Greg and his mom solved the equation $\frac{3}{4}x = 15$ using 2 different solution methods.

(Point to both equations and write "Operations that undo each other".)

Fourth, I need to figure out what I can try.

I am going to try finding a number expressions that is different in both solution methods and one that is the same.

I see that Greg's mom divided both sides by 3 fourths…but I don't see any division expressions in Greg's writing...

(Write the word "Difference" and draw an arrow pointing to the "$\div \frac{3}{4}$.")

Also, I see the equation "x = 15 · $\frac{4}{3}$" in both solution methods.

(Write the word "Similar" and draw arrows pointing to the both equations "x = 15 · $\frac{4}{3}$".)

I think Greg's mom used the "multiply by the reciprocal" method for dividing fractions because 15 divided by 3 fourths became 15 times 4 thirds.

(Point to the "$\div \frac{3}{4}$" and then the "15 · $\frac{4}{3}$".)

She wrote 1 · x… (Point to the 1)…**since any number divided by itself is equal to 1.**

And, she turned the whole number, 15, into an equivalent fraction by making the denominator 1.

Then, she rewrote the 15 as two of its factors…3 and 5…(Point to the 3 · 5)…

so that she could cancel the common factors…3…since 3 thirds is equal to 1 whole. (Point to the 3 · 5)

Therefore, Greg's mom multiplied 5 times 4 to get her solution. (Point to the 5 · 4 and 20.)

Greg's Drawing

Greg's Mom's solution using inverse operations

Last, I need to make sure that my answer makes sense.

I found that Greg normally gets $20 for allowance. This makes sense because they both used the same solution equation to get their answers…and the only difference was that Greg used his understanding by drawing a picture and his mom used her understanding by using the inverse operations solution method.

Session 5: Guided Practice (We Do)

We Do Together: (Teacher Actions)

➢ Translate the equation into a phrase with meaning. Then, find the value of x using the "inverse operations" solution method.

1. $2x = 10$	**2.** $x + 7 = 10$
3. $\frac{2}{5}x = 20$	**4.** $x + 3\frac{1}{4} = 9$
5. $9 = x + 4$	**6.** $9 = \frac{3}{4}x$

Session 5: Guided Practice (We Do - Continued)

You Do Together: (As a class, or in small groups)

➢ Students take turns leading to solve each 1-step equation.

7. $$4x = 12$$	**8.** $$x + 4 = 12$$
9. $$\frac{1}{2}x = 12$$	**10.** $$x + 3\frac{1}{3} = 10$$
11. $$10 = x + 3\frac{2}{5}$$	**12.** $$15 = \frac{3}{4}x$$

Learning Target: I will solve 1-step equations

Session 5: Guided Practice (We Do – Teacher Notes)

We Do Together: (Teacher Actions)

➢ Translate the equation into a phrase with meaning. Then, find the value of x using the "inverse operations" solution method.

2 times what number is equal to 10?	*What number plus 7 is equal to 10?*

1.

Undo multiplication by dividing

$$2x = 10$$

$\div 2 \qquad \div 2$ *Maintain Equality*

Any number divided by itself is 1

$$1 \cdot x = 10 \div 2$$

$$x = 5$$

2.

$$x + 7 = 10$$

Undo addition by subtracting $-7 \qquad -7$ *Maintain Equality*

$$x = 3$$

---

2 fifths of what number is equal to 10?	*What number plus 3 and 1 fourth is equal to 9?*

3.

$$\frac{2}{5}x = 20$$

Undo multiplication by dividing $\div \frac{2}{5} \qquad \div \frac{2}{5}$ *Maintain Equality*

Any number divided by itself is 1

$$1 \cdot x = \frac{20}{1} \cdot \frac{5}{2} \qquad \frac{2 \cdot 10}{}$$

Use the division strategy "multiply by the reciprocal"

Simplify using the common factor, 2.

$$x = 50$$

4.

$$x + 3\frac{1}{4} = 9$$

Undo addition by subtracting $-3\frac{1}{4} \qquad -3\frac{1}{4}$ *Maintain Equality*

$$x = 8\frac{4}{4}$$

Ungroup one whole as 4 fourths

$$-3\frac{1}{4}$$

$$x = 5\frac{3}{4}$$

---

9 is equal to what number plus 4?	*9 is equal to 3 fourths of what number?*

5.

$$9 = x + 4$$

Maintain Equality $-4 \qquad -4$ *Undo addition by subtracting*

$$5 = x$$

6.

$$9 = \frac{3}{4}x$$

Maintain Equality $\div \frac{3}{4} \qquad \div \frac{3}{4}$ *Undo multiplication by dividing*

Use the division strategy "multiply by the reciprocal"

Simplify using the common factor, 3.

$$\frac{9}{1} \cdot \frac{4}{3} = 1 \cdot x \qquad \frac{3 \cdot 3}{}$$

Any number divided by itself is 1

$$12 = x$$

Learning Target: I will solve 1-step equations

Briefly discuss student responses

> ➢ What did I learn today about solving 1-step equations?

> ➢ How confident do I feel about solving 1-step equations on my own? *(Thumbs up, down, or sideways)*

Quick Check - Form E

7th Grade – Readiness Standard 6 – 6.EE.7

Name_____ Date_____

Learning Target: I will solve 1-step equations.

Directions: Solve each equation for *x*. (Work time: 4 minutes)

1. $x + 6 = 12$	**2.** $x + 3\frac{1}{2} = 9$
3. $4x = 20$	**4.** $\frac{1}{4}x = 6$
5. $x + 2\frac{3}{4} = 7$	**6.** $\frac{2}{3}x = 8$

Session 6: Guided Practice (We Do)

We Do Together: (Teacher Actions)

➢ Translate the equation into a phrase with meaning. Then, use a math drawing to find the solution.

1. $x + 4 = 11$	**2.** $4x = 20$
3. $12 = 3x$	**4.** $14 = 6 + x$

Session 6: Guided Practice (We Do - Continued)

You Do Together: (As a class, or in small groups)

➢ Students take turns leading to solve each 1-step equation using math drawings.

5. $x + 3 = 9$	**6.** $5x = 10$
7. $15 = x + 7$	**8.** $21 = 3x$
9. $2x = 14$	**10.** $x + 5 = 17$

Learning Target: I will solve 1-step equations

Briefly discuss student responses

➢ What did I learn today about solving 1-step equations?

➢ How confident do I feel about solving 1-step equations on my own? *(Thumbs up, down, or sideways)*

Quick Check - Form F

Name_____ Date_____

Learning Target: I will solve 1-step equations.

Directions: Solve each equation for *x*. (Work time: 4 minutes)

1. $x + 4 = 16$	**2.** $x + 2\frac{1}{3} = 4$
3. $3x = 15$	**4.** $\frac{1}{4}x = 2$
5. $x + 3\frac{2}{5} = 8$	**6.** $\frac{3}{4}x = 9$

Learning Target: I will solve 1-step equations

Session 7: Guided Practice (We Do)

We Do Together: (Teacher Actions)

➢ Translate the equation into a phrase with meaning. Then, complete the math drawing to find the solution.

1. *"1 third of what number is equal to 7?"* $\frac{1}{3}x = 8$ +x-tile	**2.** $\frac{1}{4}x = 3$ +x-tile
3. $7 = \frac{2}{5}x$ +x-tile	**4.** $\frac{3}{4}x = 18$ +x-tile

Learning Target: I will solve 1-step equations   7th Grade - RS 6 - 6.EE.7

Session 7: Guided Practice (We Do - Continued)

You Do Together: (As a class, or in small groups)

➢ Students take turns leading to solve each 1-step equation.

5. *"1 fourth of what number is equal to 7?"* $$\frac{1}{4}x = 9$$ +x-tile	**6.** $$\frac{2}{3}x = 7$$ +x-tile
7. $$12 = 3x$$	**8.** $$\frac{1}{3}x = 8$$ +x-tile
9. $$6 = \frac{3}{5}x$$ +x-tile	**10.** $$4x = 20$$

Learning Target: I will solve 1-step equations

Briefly discuss student responses

➢ What did I learn today about solving 1-step equations?

➢ How confident do I feel about solving 1-step equations on my own? *(Thumbs up, down, or sideways)*

Name_____ Date_____

Learning Target: I will solve 1-step equations.

Directions: Solve each equation for *x*. (Work time: 4 minutes)

1. $x + 5 = 6$	**2.** $x + 2\frac{1}{4} = 9$
3. $6x = 30$	**4.** $\frac{1}{6}x = 3$
5. $x + 4\frac{2}{3} = 7$	**6.** $\frac{2}{5}x = 8$

Session 8: Guided Practice (We Do)

We Do Together: (Teacher Actions)

➤ Translate the equation into a phrase with meaning. Then, find the value of x using the "inverse operations" solution method.

1. $2x = 18$	2. $x + 7 = 12$
3. $\frac{2}{5}x = 10$	4. $x + 2\frac{1}{4} = 6$
5. $13 = x + 4$	6. $18 = \frac{3}{4}x$

Session 8: Guided Practice (We Do - Continued)

You Do Together: (As a class, or in small groups)

➢ Students take turns leading to solve each 1-step equation.

7. $$4x = 24$$	**8.** $$x + 5 = 12$$
9. $$\frac{1}{2}x = 15$$	**10.** $$x + 3\frac{1}{3} = 9$$
11. $$8 = x + 3\frac{2}{5}$$	**12.** $$24 = \frac{3}{4}x$$

Learning Target: I will solve 1-step equations

Briefly discuss student responses

> ➢ What did I learn today about solving 1-step equations?

> ➢ How confident do I feel about solving 1-step equations on my own? *(Thumbs up, down, or sideways)*

Quick Check - Form H

7th Grade – Readiness Standard 6 – 6.EE.7

Name_____ Date_____

Learning Target: I will solve 1-step equations.

Directions: Solve each equation for *x*. (Work time: 4 minutes)

1. $$x + 9 = 11$$	**2.** $$x + 4\frac{1}{3} = 6$$
3. $$2x = 14$$	**4.** $$\frac{1}{3}x = 8$$
5. $$x + 1\frac{3}{5} = 9$$	**6.** $$\frac{2}{3}x = 10$$

Learning Target: I will solve 1-step equations

Readiness for solving equations with more than one step

Title of Game: Play "**Solve 1-step Equations Match-up**!"

Number of Players: 2

Objective: To match all of your **"Equation"** cards to the equivalent **"Solution"** cards.

Materials:

➢ 1 set of **Equation** and **Solution** cards per group

➢ 1 recording sheet per player

Set-up:

➢ Deal all 12 **Equation** cards face down in a row.

➢ Deal 6 **Solution** cards face up to each player.

Directions:

➢ **Player 1** goes first
   o Take a card from the row of face down **Equation** cards and turn it face up
   o Write the problem on the recording sheet
   o And, find the answer in simplest form

➢ If **Player 1** has the **Solution** card, place it face up on top of the **Equation** card, take both cards and say:

   Example "2 times what number is equal to 10…I undid multiplying by 2 with dividing by 2"

➢ If **Player 1** does not have the answer to the **Equation** card, turn the **Equation** card back over.

➢ **Players 1 and 2** alternate turns. The **winner** is the first player to match all 5 of their cards.

Equation Cards (Set A)

7th Grade – Readiness Standard 6 – 6.EE.7

Storage Suggestions: Copy the **Equation (Set A)** cards and **Solution (Set A)** cards in two different colors.

Store 1 set of each in a sealable bag for each pair of students.

Set A₁

$x + 5 = 6$ Set A	$x + 1 = 6$ Set A		
$2x = 6$ Set A	$3x = 6$ Set A	$\frac{1}{3}x = 6$ Set A	$\frac{2}{3}x = 6$ Set A
$9 = x + 4$ Set A	$9 = x + 4\frac{1}{3}$ Set A	$8 = 2x$ Set A	$8 = \frac{2}{3}x$ Set A

Set A₂

$x + 5 = 6$ Set A	$x + 1 = 6$ Set A		
$2x = 6$ Set A	$3x = 6$ Set A	$\frac{1}{3}x = 6$ Set A	$\frac{2}{3}x = 6$ Set A
$9 = x + 4$ Set A	$9 = x + 4\frac{1}{3}$ Set A	$8 = 2x$ Set A	$8 = \frac{2}{3}x$ Set A

Storage Suggestions: Copy the **Equation (Set A)** cards and **Solution (Set A)** cards in two different colors. Store 1 set of each in a sealable bag for each pair of students.

Set A₁

$x = 1$ Set A	$x = 5$ Set A		
$x = 3$ Set A	$x = 2$ Set A	$x = 18$ Set A	$x = 9$ Set A
$x = 5$ Set A	$x = 4\frac{2}{3}$ Set A	$x = 4$ Set A	$x = 12$ Set A

Set A₂

$x = 1$ Set A	$x = 5$ Set A		
$x = 3$ Set A	$x = 2$ Set A	$x = 18$ Set A	$x = 9$ Set A
$x = 5$ Set A	$x = 4\frac{2}{3}$ Set A	$x = 4$ Set A	$x = 12$ Set A

Equation Cards (Set B)

7th Grade – Readiness Standard 6 – 6.EE.7

Storage Suggestions: Copy the **Equation (Set B)** cards and **Solution (Set B)** cards in two different colors.
Store 1 set of each in a sealable bag for each pair of students.

Set B₁

$x + 3 = 12$ Set B	$x + 4 = 12$ Set B	$x + 3\frac{1}{4} = 12$ Set B	$x + 4\frac{3}{4} = 12$ Set B
 	 	$\frac{1}{4}x = 12$ Set B	$\frac{3}{4}x = 12$ Set B
$15 = x + 3$ Set B	$15 = x + 4\frac{1}{3}$ Set B	$15 = 3x$ Set B	$14 = \frac{2}{3}x$ Set B

Set B₂

$x + 3 = 12$ Set B	$x + 4 = 12$ Set B	$x + 3\frac{1}{4} = 12$ Set B	$x + 4\frac{3}{4} = 12$ Set B
 	 	$\frac{1}{4}x = 12$ Set B	$\frac{3}{4}x = 12$ Set B
$15 = x + 3$ Set B	$15 = x + 4\frac{1}{3}$ Set B	$15 = 3x$ Set B	$14 = \frac{2}{3}x$ Set B

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Storage Suggestions: Copy the **Equation (Set B)** cards and **Solution (Set B)** cards in two different colors.
Store 1 set of each in a sealable bag for each pair of students.

Set B₁

$x = 9$	$x = 8$	$x = 8\frac{3}{4}$	$x = 7\frac{1}{4}$
Set B	Set B	Set B	Set B
		$x = 48$	$x = 16$
		Set B	Set B
$x = 12$	$x = 10\frac{2}{3}$	$x = 5$	$x = 21$
Set B	Set B	Set B	Set B

Set B₂

$x = 9$	$x = 8$	$x = 8\frac{3}{4}$	$x = 7\frac{1}{4}$
Set B	Set B	Set B	Set B
		$x = 48$	$x = 16$
		Set B	Set B
$x = 12$	$x = 10\frac{2}{3}$	$x = 5$	$x = 21$
Set B	Set B	Set B	Set B

Q₁

What is the problem about?

Q₂

What do I need to find?

Q₃

What do I know?

Q₄

What can I try?

Q₅

Does my answer make sense?

Steps for Solving Word Problems

Q₁. What is the problem about?

Q₂. What do I need to find?

Q₃. What do I know?

Q₄. What can I try?

Q₅. Does my answer make sense?