



8th Grade

Tier 2 Intervention Lessons

Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Readiness for A.SSE.3a: Factoring quadratic equations

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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

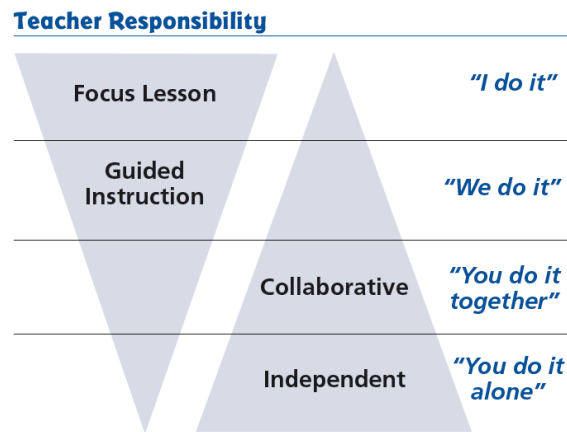


Figure 1

[\(Dr. Douglas Fisher, Effective Use of the Gradual Release of Responsibility Model\)](#)



Planning Guide: Session 1

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Readiness for factoring quadratic equations

Recommended Actions	
Beginning (15 min.)	<p><u>Review</u> the readiness standard with the intervention group using the Guided Review</p> <ul style="list-style-type: none">○ Introduce the learning target and why it is important for future learning○ Read each question on the Guided Review and ask students to share what they remember from the previous school year.
Middle (5 min.)	<ul style="list-style-type: none">➤ Ask students to <u>reflect</u> on their progress towards the learning target<ul style="list-style-type: none">○ What did I remember about 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?
End (10 min.)	<ul style="list-style-type: none">➤ <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	<ul style="list-style-type: none">➤ Create sub-groups to differentiate the middle of sessions 2 through 8<ul style="list-style-type: none">○ Group 1 – Include students who <u>did not</u> meet the learning goal○ Group 2 – Include students who met or exceeded the learning goal



8th Grade Fall Guided Review

Readiness Standard 5 - 7.EE.1c

Name _____ Date _____

Learning Target: I will factor linear expressions.

1.

Find the equivalent factored expression:

$$6x + 18$$

- ☐ $6(x + 3)$ ☐ $6(x + 18)$ ☐ $24x$ ☐ $6x + 3$

2.

Find the equivalent factored expression:

$$20x - 5$$

- ☐ $-5(4x + 1)$ ☐ $5(4x - 1)$ ☐ $15x$ ☐ $5(15x - 1)$

3.

Find the equivalent factored expression:

$$8x + 12$$

- ☐ $8(x + 4)$ ☐ $4(4x + 8)$ ☐ $20x$ ☐ $4(2x + 3)$



8th Grade Winter Guided Review

Readiness Standard 5 - 7.EE.1c

Name _____ Date _____

Learning Target: I will factor linear expressions.

1.

Find the equivalent factored expression:

$$5x + 30$$

- ☐ $5(x + 6)$ ☐ $5(x + 30)$ ☐ $35x$ ☐ $5x + 6$

2.

Find the equivalent factored expression:

$$12x - 4$$

- ☐ $-4(3x + 1)$ ☐ $4(3x - 1)$ ☐ $8x$ ☐ $4(8x - 1)$

3.

Find the equivalent factored expression:

$$6x + 15$$

- ☐ $6(x + 9)$ ☐ $3(3x + 12)$ ☐ $21x$ ☐ $3(2x + 5)$



8th Grade Spring Guided Review

Readiness Standard 5 - 7.EE.1c

Name _____ Date _____

Learning Target: I will factor linear expressions.

1.

Find the equivalent factored expression:

$$4x + 20$$

- ☐ $4(x + 20)$ ☐ $4(x + 5)$ ☐ $24x$ ☐ $4x + 5$

2.

Find the equivalent factored expression:

$$24x - 3$$

- ☐ $-3(8x + 1)$ ☐ $3(8x - 1)$ ☐ $21x$ ☐ $3(21x - 1)$

3.

Find the equivalent factored expression:

$$15x + 35$$

- ☐ $15(x + 20)$ ☐ $5(3x + 7)$ ☐ $50x$ ☐ $5(10x + 30)$



Session 1: Self-Reflection

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Briefly discuss student responses

- What did I remember about factoring linear expressions?
- What did I learn today about factoring linear expressions?
- How confident do I feel about factoring linear expressions on my own? (*Thumbs up, down, or sideways*)



Quick Check - Form A

8th Grade – Readiness Standard 5 – 7.EE.1c

Name _____ Date _____

Learning Target: I will factor linear expressions.

Directions: Write the equivalent factored expression. (Work time: 5 minutes)

1. $8x + 24$	2. $27x - 9$
3. $10x - 45$	4. $5x - 20$
5. $24x + 4$	6. $9x + 12$



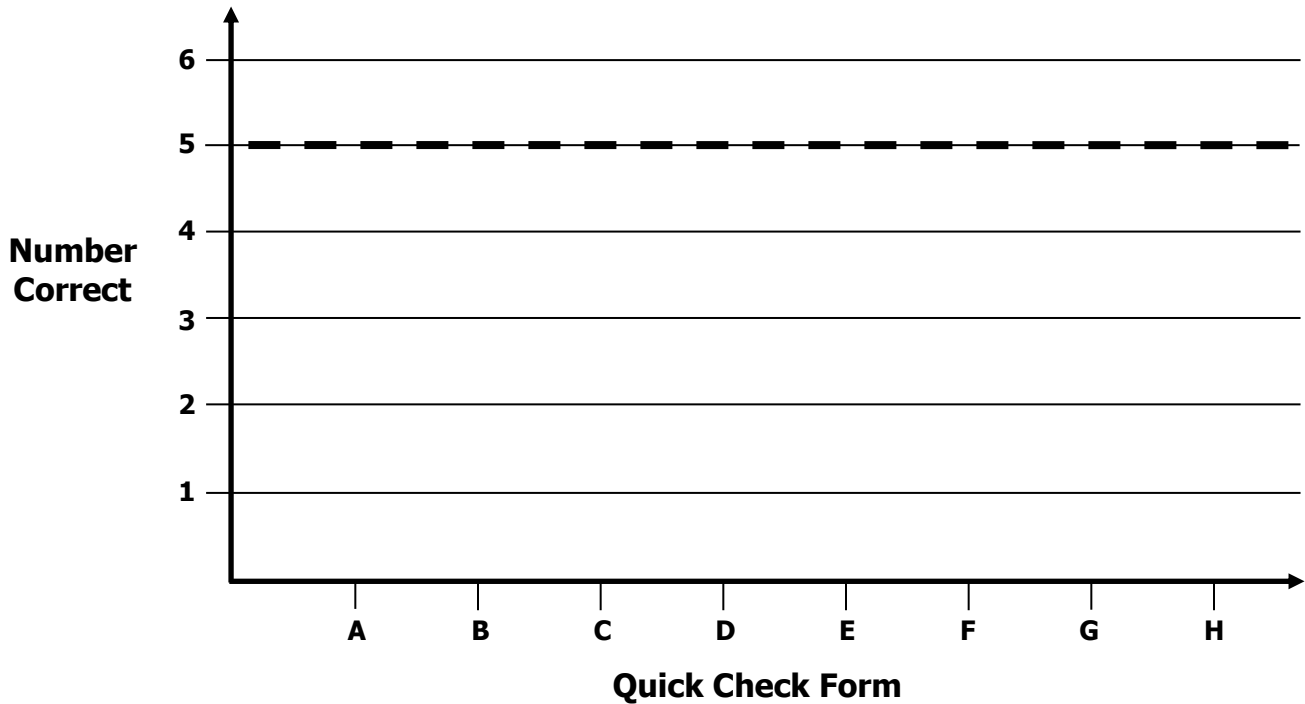
Growth Chart

8th Grade – Readiness Standard 5 – 7.EE.1c

Name _____ Date _____

Learning Target: I will factor linear expressions.

Goal: 5 out of 6 correct



Intervention	Date	Score
Guided Review		



Planning Guide: Sessions 2 Through 8

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Readiness for factoring quadratic equations

Recommended Actions		
Beginning (5 min.)	<ul style="list-style-type: none"> ➤ Review the learning target with the whole group and ask each student to set a goal. 	
Middle (15 min.)	<p>Group 1: Students who scored below the learning goal on the previous Quick Check.</p> <ul style="list-style-type: none"> ➤ Model solving a word problem – “I do” ➤ Guided Practice – “We do” <p>Session 2: Factor linear expressions using algebra tiles.</p> <p>Session 3: Factor linear expressions using drawings.</p> <p>Session 4: Factor linear expressions using the greatest common factor.</p>	<p>Group 2: <i>(Students who met the learning goal)</i></p> <ul style="list-style-type: none"> ➤ Independent practice – “You do alone” <p>Activity 1: “Factor Linear Expressions Match-up”</p> <p><i>(Look for additional activities in 7th grade core instruction resources.)</i></p>
End (10 min.)	<ul style="list-style-type: none"> ➤ Bring the students back together. ➤ Ask students to reflect on their progress towards the learning target <ul style="list-style-type: none"> ○ What did I learn today about factoring linear expressions? ○ How confident do you feel about factoring linear expressions 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 <ul style="list-style-type: none"> ○ If not using Delta Math lessons, record the activity in the table ➤ Collect each student’s Quick Check and Growth Chart 	
After	<ul style="list-style-type: none"> ➤ Regroup students to differentiate the middle of sessions 3 through 8 <ul style="list-style-type: none"> ○ 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 	



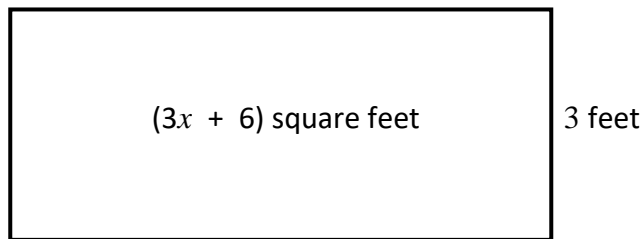
Session 2: Modeling (I Do)

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Readiness for factoring quadratic equations

Sami needs to install a brick border around a rectangular shaped pathway. The width of the pathway is 3 feet and the area can be represented by the expanded algebraic expression $3x + 6$. Find the algebraic expression that represents the length of the pathway. Then, find the perimeter of the pathway Sami needs to border when the unknown, x , is equal to 4 feet.





Session 2: Modeling (*I Do – Visual Support*)

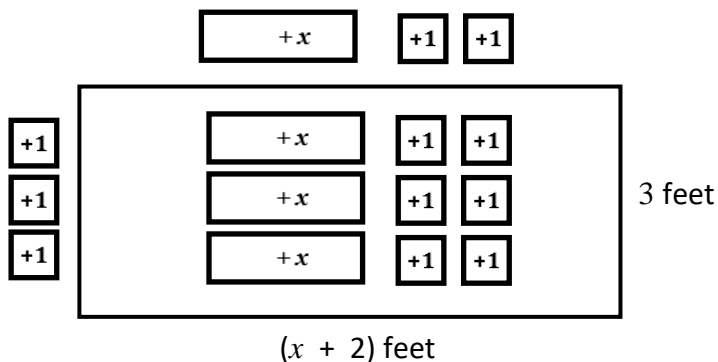
8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Readiness for factoring quadratic equations

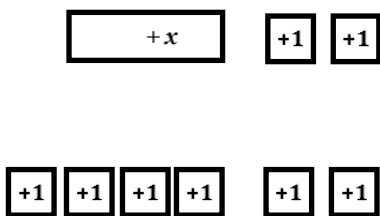
Sami needs to install a brick border around a rectangular shaped pathway. The width of the pathway is 3 feet and the area can be represented by the expanded algebraic expression $3x + 6$. Find the algebraic expression that represents the length of the pathway. Then, find the length of the pathway Sami needs to border when the unknown, x , is equal to 4 feet.

Find the Algebraic Length



$$\text{Algebraic Length} = x + 2$$

Find the Length when $x = 4$ feet



$$\text{Length} = 6 \text{ feet}$$



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

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Readiness for factoring quadratic equations

Sami needs to install a brick border around a rectangular shaped pathway....

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 a border Sami needs to install around a pathway.

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

I need to find the algebraic expression for the length when the unknown, x , is equal to 4 feet.

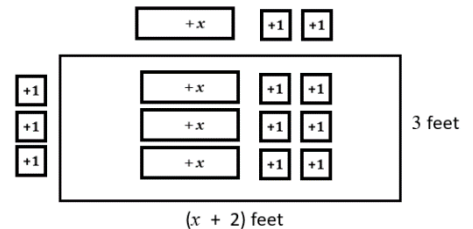
Third, I need to determine what I know.

I know the shape of the garden is a rectangle and its area can be represented using the expanded expression $3x + 6$. (Write “Area = $3x + 6$ ” below the drawing and point to the area and width in the drawing.)

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

I am going to use algebra tiles to help me model this problem.

I will place 3 positive 1-tiles next to the width and I will find 3 x -tiles and 6 positive 1-tiles to place inside the rectangle.
(Place the algebra tiles on the paper.)



Since the width is 3, I should be able to model the area as 3 equal groups.

I just have to figure out how many should be in each group.
(Point to the pile of algebra tiles inside the rectangle.)

$$\text{Algebraic Length} = x + 2$$

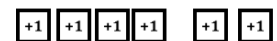
The 3 positive x -tiles share equally as 1 in each group.

(Organize the 3 x -tiles so they are aligned with each tile for the width.)



And the 6 positive 1-tiles share equally as 2 in each group.

(Organize the 6 tiles so that 2 are aligned with each tile for the width.)



It looks like the algebraic length is $x + 2$.

(Point to the x and 2 positive 1-tiles in each group, place tiles above the rectangle and write “Algebraic length = $x + 2$ ”.)

$$\text{Length} = 6 \text{ feet}$$

Now, we want to find the length when x is equal to 4 feet.

I can replace each positive x -tile with 4 positive 1-tiles.

(Replace the x -tile with 4 positive 1-tiles.)

The length is 6 feet.

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

This makes sense because I modeled the width and area using algebra tiles. I divided the area by the width to create equal groups to find the algebraic length. Then, I replaced each x tile with 4 positive 1 tiles to find the length in feet.



Name _____

Date _____

Learning Target: I will factor linear expressions

8th Grade - RS 5 - 7.EE.1c

Session 2: Guided Practice (We Do)

Materials:

- Algebra Tiles (1 set from p. 13 and p. 14: 20 +1-tiles, 20 -1-tiles, 16 +x-tiles and 16 +x-tiles per student)
- Multiplication/Factor Mat (1 per student)

We Do Together: (Teacher Actions)

- Say, build and factor each linear expression to find both products.

Problem type A: When the **coefficient** is a factor of the **constant**, such as $2x + 8$.

1. $4x + 12$	2. $3x + 15$
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Problem type B: When the **coefficient** is **not** a factor of the **constant**, such as $8x + 12$.

3. $6x - 9$	4. $-4x + 10$
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Name _____

Date _____

Learning Target: I will factor linear expressions8th Grade - RS 5 - 7.EE.1c

Session 2: Guided Practice (We Do - Continued)

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

- Students take turns leading to factor each linear expression.

5. $3x + 12$	6. $4x + 12$
7. $10x + 15$	8. $10x - 15$
9. $-3x + 6$	10. $-6x - 12$

Learning Target: I will factor linear expressions

8th Grade - RS 5 - 7.EE.1c

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

Materials:

- Algebra Tiles (1 set from p. 13 and p. 14: 20 +1-tiles, 20 -1-tiles, 16 +x-tiles and 16 -x-tiles per student)
- Multiplication/Factor Mat (1 per student)

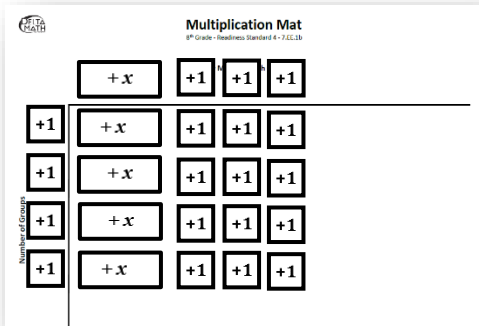
We Do Together: (Teacher Actions)

- Say, build and factor each linear expression to find both products.

Problem type A: When the **coefficient** is a factor of the **constant**, such as $2x + 8$.

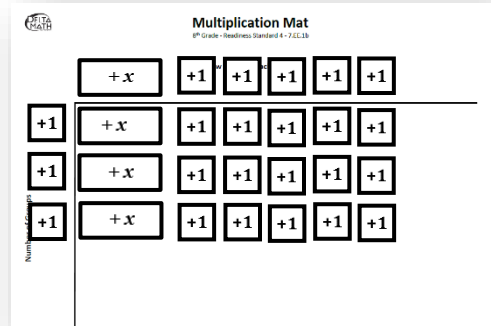
1.

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



2.

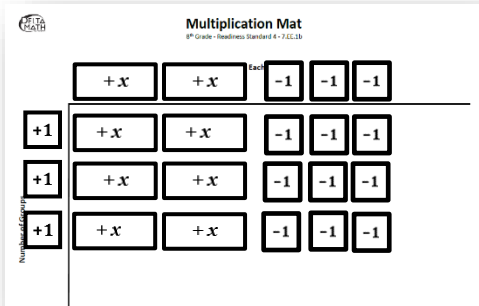
$$3x + 15 = 3(x + 5)$$



Problem type B: When the **coefficient** is **not** a factor of the **constant**, such as $8x + 12$.

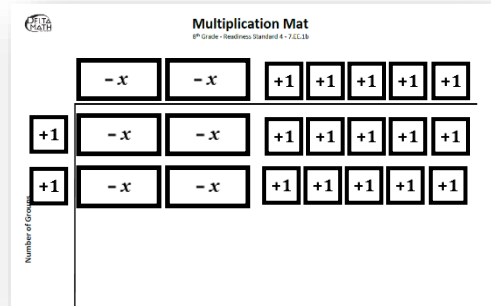
3.

$$6x - 9 = 3(2x - 3)$$



4.

$$-4x + 10 = 2(-2x + 5)$$



- *Re-write the linear expression using the “add the opposite to subtract” strategy*
- *The width is the greatest common factor of the coefficient and the constant*
- *Find the length by creating equal groups*

Algebra Tiles (2 sets of positive tiles)

8th Grade - Readiness Standards 3, 4, 5 and 6 – 7.EE.1a, 7.EE.1b, 7.EE.1c, 7.EE.4

Directions: Provide each student one set of positive and negative tiles.

Note: $+x^2$ tiles and $-x^2$ tiles are included, but will not be used in 7.EE.1c

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





Algebra Tiles (2 sets of negative tiles)

8th Grade - Readiness Standards 3, 4, 5 and 6 – 7.EE.1a, 7.EE.1b, 7.EE.1c, 7.EE.4

Directions: Provide each student one set of positive and negative tiles.

Note: $+x^2$ tiles and $-x^2$ tiles are included, but will not be used in 7.EE.1c

-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	$-x$	$-x$	$-x$	$-x$
$-x^2$		$-x^2$		$-x^2$		$-x^2$		$-x^2$
$-x^2$		$-x^2$		$-x^2$		$-x^2$		$-x^2$
-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	$-x$	$-x$	$-x$	$-x$
$-x^2$		$-x^2$		$-x^2$		$-x^2$		$-x^2$
$-x^2$		$-x^2$		$-x^2$		$-x^2$		$-x^2$





Modeling & Guided Practice Cards

8th Grade – Readiness Standard 5 – 7.EE.1c

Use for Problem 1 $4x + 12$	Use for Problem 2 $3x + 15$
Use for Problem 3 $6x - 9$	Use for Problem 4 $-4x + 10$
Use for Problem 5 $3x + 12$	Use for Problem 6 $4x + 12$
Use for Problem 7 $10x + 15$	Use for Problem 8 $10x - 15$
Use for Problem 9 $-3x + 6$	Use for Problem 10 $-6x - 12$
Use for Modelling $3x + 6$	



Session 2: Self-Reflection

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Briefly discuss student responses

- What did I learn today about factoring linear expressions?

- How confident do I feel about factoring linear expressions on my own? (*Thumbs up, down, or sideways*)



Quick Check - Form B

8th Grade – Readiness Standard 5 – 7.EE.1c

Name _____ Date _____

Learning Target: I will factor linear expressions.

Directions: Write the equivalent factored expression. (Work time: 5 minutes)

1. $7x + 56$	2. $30x + 6$
3. $8x - 20$	4. $3x - 12$
5. $36x + 4$	6. $12x - 42$



Session 3: Modeling (I Do)

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Readiness for factoring quadratic equations to help understand the functions they define

Adam needs to cover a rectangular floor with tiles. The width of the room is 9 feet and algebraic area can be represented by the expanded expression, $18x - 45$. Find the algebraic expression that represents the length of the floor. Then, find the length of the floor when the unknown, x , is equal to 10 feet.

9 feet





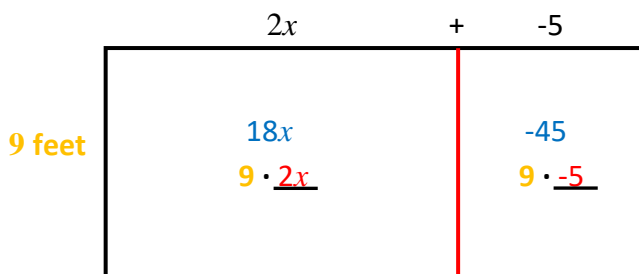
Session 3: Modeling (I Do – Visual Support)

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Readiness for factoring quadratic equations

Adam needs to cover a rectangular floor with tiles. The width of the room is 9 feet and algebraic area can be represented by the expanded expression, $18x - 45$. Find the algebraic expression that represents the length of the floor. Then, find the length of the floor when the unknown, x , is equal to 10 feet.



$$\begin{aligned}\text{Algebraic Area} &= 18x - 45 \\ &= 18x + -45 \\ &= 9(2x + -5)\end{aligned}$$

↑ ↑
Width Length

When $x = 10$ feet, the length is 15 feet

$$\begin{aligned}2x + -5 \\ 2(10) + -5 \\ 20 + -5 \\ 15\end{aligned}$$

- Re-write the linear expression using the “add the opposite to subtract” strategy
- The width is the greatest common factor of the coefficient and the constant
- Find the length by creating equal groups

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*)

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Readiness for factoring quadratic equations

Adam needs to cover a rectangular floor with tiles...

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 Adam covering a floor.

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

I need to find the algebraic expression that represents the length of the floor and the length of the floor when the unknown, x , is equal to 10 feet. (Point to the width “9” and length to be determined.)

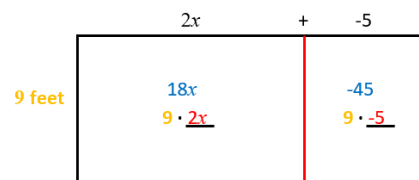
Third, I need to determine what I know.

I know the shape of the floor is a rectangle and its expanded area is represented by the expression $18x - 45$. (Write “Algebraic Area = $18x - 45$ ” below the drawing.)

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

I will begin by drawing an area model, similar to when we expanded using algebra tiles.

(Draw a rectangle and label the width “9 feet”.)



Next, I will separate the area into 2 partial areas.

(Draw a vertical line inside the rectangle.)

And, rewrite the area using the “add the opposite to subtract” strategy.

(Point to the subtraction sign in the expression for the area.)

$$\begin{aligned} \text{Algebraic Area} &= 18x - 45 \\ &= 18x + -45 \\ &= 9(2x + -5) \end{aligned}$$

Width Length

When $x = 10$ feet, the length is 15 feet

$$\begin{aligned} 2x + -5 \\ 2(10) + -5 \\ 20 + -5 \\ 15 \end{aligned}$$

Subtracting 45 is equal to adding negative 45, so I can rewrite the area as $18x + -45$.

(Write “ $18x + -45$ ” below the algebraic area and then “ $18x$ ” and “ -45 ” inside the rectangle.)

Since I know the width is 9 feet, I can rewrite the area as 9 times the length, which is what I need to find.

(Write “ $= 9($)” below the algebraic area and also draw two arrows identifying the “width” and “length”.)

9 times what is equal to 18 x’s and -45 ones?

(Write “ $9 \cdot$ ” below the $18x$ inside the first area and “ $9 \cdot$ ” below the -45 inside the second area.)

9 times 2 x’s is equal to 18 x’s and 9 times -5 is equal to negative 45.

(Write “ $2x$ ” on the first blank and “ -5 ” on the second.)

So, the algebraic length is $2x + -5$. (Write “ $2x + -5$ ” above the rectangle and inside the open parentheses.)

When x is equal to 10 feet... (Write “When $x = 10$ feet” and “ $2x + -5$ ”)

...we can substitute the x with 10. (Write “ $2(10) + -5$ ”.)

2 groups of 10 is 20 plus negative 5. (Write “ $20 + -5$ ”)

...and $20 + -5$ is equal to 15 positives. (Write “15” and “the length is 15 feet”.)

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

This makes sense because I modeled the area and width in a math drawing. Then, I found the algebraic length using partial areas. And, I found the length when $x = 10$ feet by substituting the x with 10.



Name _____

Date _____





Learning Target: I will factor linear expressions8th Grade - RS 5 - 7.EE.1c

Session 3: Guided Practice (We Do)

We Do Together: (Teacher Actions)

- Say, draw and factor each linear expression using a math drawing.

Note: The width is the greatest common factor of the coefficient and the constant.

<p>1.</p> $4x + 12$ 	<p>2.</p> $3x + 15$ 
<p>3.</p> $6x - 15$ 	<p>4.</p> $12x - 8$ 

Session 3: Guided Practice (We Do - Continued)

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

- Students take turns leading to factor each linear expression using a math drawing.

5.

$$3x + 12$$

--	--

6.

$$5x + 20$$

--	--

7.

$$9x - 15$$

--	--

8.

$$10x - 6$$

--	--

9.

$$6x + 3$$

--	--

10.

$$4x - 24$$

--	--

Learning Target: I will factor linear expressions

8th Grade - RS 5 - 7.EE.1c

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

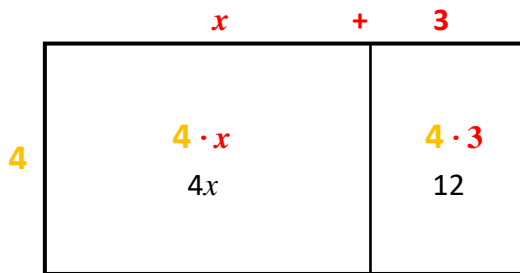
We Do Together: (Teacher Actions)

- Say, draw and factor each linear expression using a math drawing.

Note: The width is the greatest common factor of the coefficient and the constant.

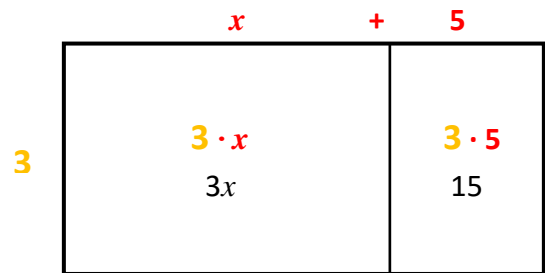
1.

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



2.

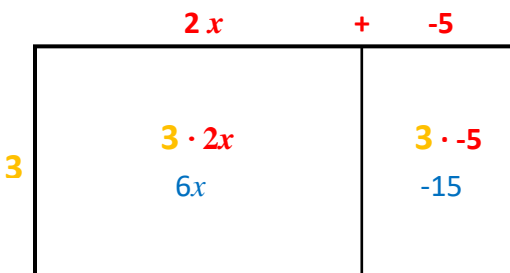
$$3x + 15 = 3(x + 5)$$



3.

$$6x + -15 = 3(2x + -5)$$

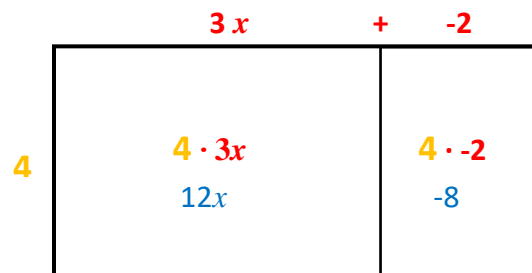
$$6x - 15$$



4.

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

$$12x - 8$$



- Re-write the linear expression using the “add the opposite to subtract” strategy
- The width is the greatest common factor of the coefficient and the constant
- Find the length by creating equal groups



Session 3: Self-Reflection

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will expand factor expressions

Briefly discuss student responses

- What did I learn today about factoring linear expressions?

- How confident do I feel about factoring linear expressions on my own? (*Thumbs up, down, or sideways*)



Quick Check - Form C

8th Grade – Readiness Standard 5 – 7.EE.1c

Name _____ Date _____

Learning Target: I will factor linear expressions.

Directions: Write the equivalent factored expression. (Work time: 5 minutes)

1. $6x + 42$	2. $18x - 3$
3. $21x - 35$	4. $4x + 24$
5. $56x + 7$	6. $12x - 27$



Session 4: Modeling (I Do)

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Readiness for factoring quadratic equations

On the Delta Math readiness screener, Joe selected the following answer choice. Is he correct?
If not, why do you think he chose his answer?

Find the equivalent factored expression:

$$20x - 5$$

- ☐ $-5(4x + 1)$ ☒ $5(4x - 1)$ ☐ $15x$ ☐ $5(15x - 1)$



Session 4: Modeling (I Do)

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Readiness for factoring quadratic equations

On the Delta Math readiness screener, Joe selected the following answer choice. Is he correct?
If not, why do you think he chose his answer?

Find the equivalent factored expression:

Twenty x 's and five -1 's $\nearrow 20x - 5 = 20x + -5 = 5(4x + -1)$

$\begin{array}{l} 1 \cdot 20 \cdot x \\ 2 \cdot 10 \cdot x \\ \underline{4 \cdot 5 \cdot x} \end{array} \quad \begin{array}{l} -1 \cdot 5 \\ 1 \cdot -5 \end{array}$

- ☐ $-5(4x + 1)$ ☒ $5(4x - 1)$ ☐ $15x$ ☐ $5(15x - 1)$

- Re-write the linear expression using the “add the opposite to subtract” strategy
- The width is the greatest common factor of the coefficient and the constant
- Find the length by creating equal groups



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

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Readiness for factoring quadratic equations

On the Delta Math readiness screener, Joe selected the following answer choice. Is he correct?
If not, why do you think he chose his answer?

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

This problem is about Joe answering a problem on a Delta Math readiness screener.

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

I need to find if Joe chose the correct answer. And if he was not correct, I need to consider why he made the choice that he did.

Third, I need to determine what I know.

**I know that Joe chose “ $5(4x - 1)$ ” as the factored answer. I also know that there are twenty x ’s and 5 -1’s.
(Draw an arrow and write “Twenty x ’s and five -1’s”.)**

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

I am going to try writing an equivalent expression using factor pairs of the coefficient and constant.

Factors of $20x$ are $1 \cdot 20 \cdot x$, $2 \cdot 10 \cdot x$, and $4 \cdot 5 \cdot x$.

(Write each set of factors below the “ $20x$ ”.)

Find the equivalent factored expression:

$$20x - 5 = 20x + -5 = 5(4x - 1)$$

Twenty x ’s and five -1’s

$$\begin{array}{l} \underline{1} \cdot 20 \cdot x \\ \underline{2} \cdot 10 \cdot x \\ \underline{4} \cdot \underline{5} \cdot x \end{array} \quad \begin{array}{l} \underline{-1} \cdot \underline{5} \\ 1 \cdot -5 \end{array}$$

○ $-5(4x + 1)$ ● $5(4x - 1)$ ○ $15x$ ○ $5(15x - 1)$

And factors of -5 are $-1 \cdot 5$ and $1 \cdot -5$.

(Write each set of factors below the “-5”.)

It looks like 5 is the greatest factor that is common to both terms.

(Circle the “5” in each group of factors.)

$20x + -5$ can be written as 5 times another factor.

(Write “ $= 5(\quad)$ ”.)

The first term in the parentheses is $4x$.

(Underline the “4” and “ x ” next to the “5” in the first list of factors and write “ $4x$ ” in the parenthesis.)

The second term in the parentheses is -1.

(Underline the “-1” next to the “5” in the second list of factors and write “ $+ -1$ ” in the parenthesis.)

This is the answer choice that Joe chose...therefore, he must have been correct.

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

It makes sense because I found possible factors for the coefficient and constant to find the greatest common factor. And used them to find two products that were the same as Joes answer choice.



Name _____

Date _____

Learning Target: I will factor linear expressions8th Grade - RS 5 - 7.EE.1c

Session 4: Guided Practice (We Do)

We Do Together: (Teacher Actions)

- Factor each linear expression.

1. $15x + 5$	2. $14x - 7$
3. $8x - 12$	4. $15x - 9$



Name _____

Date _____

Learning Target: I will factor linear expressions8th Grade - RS 5 - 7.EE.1c

Session 4: Guided Practice (We Do - Continued)

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

- Students take turns leading to factor each linear expression.

5. $15x + 12$	6. $8x - 12$
7. $20x - 8$	8. $18x + 6$
9. $28x - 12$	10. $16x - 24$

Learning Target: I will factor linear expressions

8th Grade - RS 5 - 7.EE.1c

Session 4: Guided Practice (We Do)

We Do Together: (Teacher Actions)

- Factor each linear expression.

<p>1.</p> $\begin{array}{r l} 1 \cdot 15 \cdot x & 1 \cdot 5 \\ \hline 3 \cdot 5 \cdot x & \end{array}$	$15x + 5 = 5 \cdot 3x + 5 \cdot 1$ $= 5(3x + 1)$	<p>2.</p> $\begin{array}{r l} 1 \cdot 14 \cdot x & 1 \cdot -7 \\ \hline 2 \cdot 7 \cdot x & -1 \cdot 7 \end{array}$	$14x - 7 = 14x + -7$ $= 7 \cdot 2x + 7 \cdot -1$ $= 7(2x + -1)$
<p>3.</p> $\begin{array}{r l} 1 \cdot 8 \cdot x & 1 \cdot -12 \\ \hline 2 \cdot 4 \cdot x & -1 \cdot 12 \\ & 2 \cdot -6 \\ & -2 \cdot 6 \\ & 3 \cdot -4 \\ & -3 \cdot 4 \end{array}$	$8x - 12 = 8x + -12$ $= 4 \cdot 2x + 4 \cdot -3$ $= 4(2x + -3)$	<p>4.</p> $\begin{array}{r l} 1 \cdot 15 \cdot x & 1 \cdot -9 \\ \hline 3 \cdot 5 \cdot x & -1 \cdot 9 \\ & 3 \cdot -3 \end{array}$	$15x - 9 = 15x + -9$ $= 3 \cdot 5x + 3 \cdot -3$ $= 3(5x + -3)$

- Re-write the linear expression using the “add the opposite to subtract” strategy
- The width is the greatest common factor of the coefficient and the constant
- Find the length by creating equal groups



Session 4: Self-Reflection

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Briefly discuss student responses

- What did I learn today about factoring linear expressions?

- How confident do I feel about factoring linear expressions on my own? (*Thumbs up, down, or sideways*)



Quick Check - Form D

8th Grade – Readiness Standard 5 – 7.EE.1c

Name _____ Date _____

Learning Target: I will d factor linear expressions.

Directions: Write the equivalent factored expression. (Work time: 5 minutes)

1. $9x + 36$	2. $32x - 8$
3. $12x - 42$	4. $7x + 35$
5. $24x - 6$	6. $8x + 20$



Name _____

Date _____

Learning Target: I will factor linear expressions8th Grade - RS 5 - 7.EE.1c

Session 5: Guided Practice (We Do)

We Do Together: (Teacher Actions)

- Say, draw and factor each linear expression using a math drawing.

Note: The width is the greatest common factor of the coefficient and the constant.

1.

$$4x + 20$$

2.

$$3x + 21$$

3.

$$6x - 27$$

4.

$$15x - 6$$



Name _____

Date _____

Learning Target: I will factor linear expressions8th Grade - RS 5 - 7.EE.1c

Session 5: Guided Practice (We Do - Continued)

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

- Students take turns leading to factor each linear expression using a math drawing.

5.

$$3x + 15$$

--	--

6.

$$5x + 30$$

--	--

7.

$$9x - 21$$

--	--

8.

$$20x - 6$$

--	--

9.

$$12x + 3$$

--	--

10.

$$4x - 28$$

--	--



Session 5: Self-Reflection

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will expand factor expressions

Briefly discuss student responses

- What did I learn today about factoring linear expressions?

- How confident do I feel about factoring linear expressions on my own? (*Thumbs up, down, or sideways*)



Quick Check - Form E

8th Grade – Readiness Standard 5 – 7.EE.1c

Name _____ Date _____

Learning Target: I will factor linear expressions.

Directions: Write the equivalent factored expression. (Work time: 5 minutes)

1. $8x + 24$	2. $27x - 9$
3. $10x - 45$	4. $5x - 20$
6. $24x + 4$	6. $9x + 12$



Name _____

Date _____





Learning Target: I will factor linear expressions8th Grade - RS 5 - 7.EE.1c

Session 6: Guided Practice (We Do)

We Do Together: (Teacher Actions)

- Say, draw and factor each linear expression using a math drawing.

Note: The width is the greatest common factor of the coefficient and the constant.

<p>1.</p> $3x + 12$ 	<p>2.</p> $5x + 15$ 
<p>3.</p> $4x - 18$ 	<p>4.</p> $20x - 8$ 




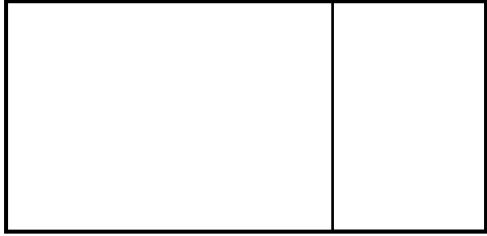

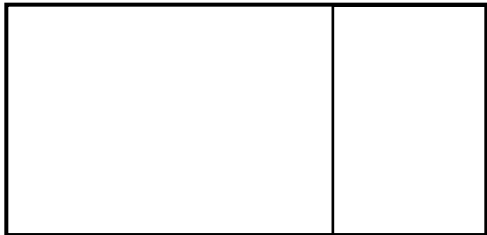
Learning Target: I will factor linear expressions

8th Grade - RS 5 - 7.EE.1c

Session 6: Guided Practice (We Do - Continued)

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

- Students take turns leading to factor each linear expression using a math drawing.

<p>5.</p> $4x + 12$ 	<p>6.</p> $2x + 20$ 
<p>7.</p> $12x - 15$ 	<p>8.</p> $10x - 8$ 
<p>9.</p> $6x + 2$ 	<p>10.</p> $8x - 24$ 



Session 6: Self-Reflection

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will expand factor expressions

Briefly discuss student responses

- What did I learn today about factoring linear expressions?

- How confident do I feel about factoring linear expressions on my own? (*Thumbs up, down, or sideways*)



Quick Check - Form F

8th Grade – Readiness Standard 5 – 7.EE.1c

Name _____ Date _____

Learning Target: I will factor linear expressions.

Directions: Write the equivalent factored expression. (Work time: 5 minutes)

1. $7x + 56$	2. $30x + 6$
3. $8x - 20$	4. $3x - 12$
6. $36x + 4$	6. $12x - 42$



Name _____

Date _____

Learning Target: I will factor linear expressions8th Grade - RS 5 - 7.EE.1c

Session 7: Guided Practice (We Do)

We Do Together: (Teacher Actions)

- Factor each linear expression.

1. $20x + 5$	2. $21x - 7$
3. $8x - 20$	4. $21x - 6$



Name _____

Date _____

Learning Target: I will factor linear expressions8th Grade - RS 5 - 7.EE.1c

Session 7: Guided Practice (We Do - Continued)

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

- Students take turns leading to factor each linear expression.

5. $18x + 12$	6. $6x - 15$
7. $28x - 8$	8. $24x + 6$
9. $30x - 12$	10. $12x - 18$



Session 7: Self-Reflection

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Briefly discuss student responses

- What did I learn today about factoring linear expressions?

- How confident do I feel about factoring linear expressions on my own? (*Thumbs up, down, or sideways*)



Quick Check - Form G

8th Grade – Readiness Standard 5 – 7.EE.1c

Name _____ Date _____

Learning Target: I will factor linear expressions.

Directions: Write the equivalent factored expression. (Work time: 5 minutes)

1. $6x + 42$	2. $18x - 3$
3. $21x - 35$	4. $4x + 24$
6. $56x + 7$	6. $12x - 27$



Name _____

Date _____

Learning Target: I will factor linear expressions8th Grade - RS 5 - 7.EE.1c

Session 8: Guided Practice (We Do)

We Do Together: (Teacher Actions)

- Factor each linear expression.

1. $35x + 5$	2. $21x - 7$
3. $8x - 20$	4. $24x - 9$



Name _____ Date _____

Learning Target: I will factor linear expressions

8th Grade - RS 5 - 7.EE.1c

Session 8: Guided Practice (We Do - Continued)

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

- Students take turns leading to factor each linear expression.

5. $18x + 12$	6. $8x - 20$
7. $28x - 8$	8. $30x + 6$
9. $16x - 12$	10. $32x - 24$



Session 8: Self-Reflection

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Briefly discuss student responses

- What did I learn today about factoring linear expressions?

- How confident do I feel about factoring linear expressions on my own? (*Thumbs up, down, or sideways*)



Quick Check - Form H

8th Grade – Readiness Standard 5 – 7.EE.1c

Name _____ Date _____

Learning Target: I will d factor linear expressions.

Directions: Write the equivalent factored expression. (Work time: 5 minutes)

1. $9x + 36$	2. $32x - 8$
3. $12x - 42$	4. $7x + 35$
6. $24x - 6$	6. $8x + 20$



Independent Practice (You Do)

8th Grade – Readiness Standard 5 – 7.EE.1c

Learning Target: I will factor linear expressions

Readiness for factoring quadratic equations

Title of Game: Play “Factor Linear Expressions Match-up!”

Number of Players: 2

Objective: To match all of your “**Problem**” cards to the equivalent “**Answer**” linear expression cards.

Materials:

- 1 set of **Problem** and **Answer** cards per group
- 1 recording sheet per player

Set-up:

- Deal all 10 **Problem** cards face down in a row.
- Deal 5 **Answer** cards face up to each player.

Directions:

- **Player 1** goes first
 - Take a card from the row of face down **Problem** cards and turn it face up
 - Write the problem on the recording sheet
 - And, find the answer in simplest form
- If **Player 1** has the **Answer** card, place it face up on top of the **Problem** card, take both cards and say:
“The value being distributed is ____.”
- If **Player 1** does not have the equivalent **Answer** card, turn the **Problem** card back over.
- **Players 1 and 2** alternate turns. The **winner** is the first player to match all 5 of their cards.



Problem Cards (Set A)

8th Grade – Readiness Standard 5 – 7.EE.1c

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

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

Set A ₁	$2x + 8$ Set A	$12x + 3$ Set A	$8x + 12$ Set A	$20x + 35$ Set A
	$8x - 2$ Set A	$3x - 12$ Set A	$12x - 8$ Set A	$35x - 20$ Set A
	$36x + 28$ Set A	$28x - 36$ Set A		
Set A ₂	$2x + 8$ Set A	$12x + 3$ Set A	$8x + 12$ Set A	$20x + 35$ Set A
	$8x - 2$ Set A	$3x - 12$ Set A	$12x - 8$ Set A	$35x - 20$ Set A
	$36x + 28$ Set A	$28x - 36$ Set A		



Answer Cards (Set A)

8th Grade – Readiness Standard 5 – 7.EE.1c

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

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

Set A ₁	$2(x + 4)$ Set A	$3(4x + 1)$ Set A	$4(2x + 3)$ Set A	$5(4x + 7)$ Set A
	$2(4x - 1)$ Set A	$3(x - 4)$ Set A	$4(3x - 2)$ Set A	$5(7x - 4)$ Set A
	$4(9x + 7)$ Set A	$4(7x - 9)$ Set A		
Set A ₂	$2(x + 4)$ Set A	$3(4x + 1)$ Set A	$4(2x + 3)$ Set A	$5(4x + 7)$ Set A
	$2(4x - 1)$ Set A	$3(x - 4)$ Set A	$4(3x - 2)$ Set A	$5(7x - 4)$ Set A
	$4(9x + 7)$ Set A	$4(7x - 9)$ Set A		



Problem Cards (Set B)

8th Grade – Readiness Standard 5 – 7.EE.1c

Storage Suggestions: Copy the **Problem (Set B)** cards and **Answer (Set B)** cards in two different colors.

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

Set B ₁	$6x + 24$ Set B	$28x + 7$ Set B	$16x + 24$ Set B	$36x + 63$ Set B
	$24x - 6$ Set B	$7x - 28$ Set B	$24x - 16$ Set B	$63x - 36$ Set B
	$15x + 10$ Set B	$10x - 15$ Set B		
Set B ₂	$6x + 24$ Set B	$28x + 7$ Set B	$16x + 24$ Set B	$36x + 63$ Set B
	$24x - 6$ Set B	$7x - 28$ Set B	$24x - 16$ Set B	$63x - 36$ Set B
	$15x + 10$ Set B	$10x - 15$ Set B		



Answer Cards (Set B)

8th Grade – Readiness Standard 5 – 7.EE.1c

Storage Suggestions: Copy the **Problem (Set B)** cards and **Answer (Set B)** cards in two different colors.

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

Set B ₁	$6(x + 4)$ Set B	$7(4x + 1)$ Set B	$8(2x + 3)$ Set B	$9(4x + 7)$ Set B
	$6(4x - 1)$ Set B	$7(x - 4)$ Set B	$8(3x - 2)$ Set B	$9(7x - 4)$ Set B
	$5(3x + 2)$ Set B	$5(2x - 3)$ Set B		
Set B ₂	$6(x + 4)$ Set B	$7(4x + 1)$ Set B	$8(2x + 3)$ Set B	$9(4x + 7)$ Set B
	$6(4x - 1)$ Set B	$7(x - 4)$ Set B	$8(3x - 2)$ Set B	$9(7x - 4)$ Set B
	$5(3x + 2)$ Set B	$5(2x - 3)$ Set B		



Questions for Solving Word Problems

Q_1

What is the problem about?

Q_2

What do I need to find?

Q_3

What do I know?

Q_4

What can I try?

Q_5

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?