Note taking guide: Solving equations with variables on both sides of the equal sign

Example 1: $3x \quad 7 \quad 2x \quad 20$

Bar Model	Decompose	Traditional
3 7 2 20	+ = +	+ = +
		#1
		#2

"You Try" for Example 1: $4 \quad +8 = 5 \quad +3$

Solution

Bar Model	Decompose	Traditional
4 8 5 3		

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Example 2: $x +$ $= x +$

Bar Model	Decompose	Traditional

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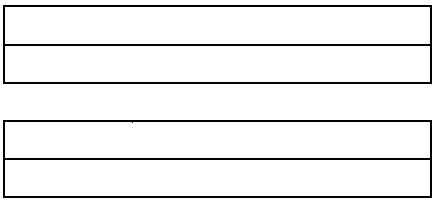
Example 3: $5x+3+2x=7x!4$

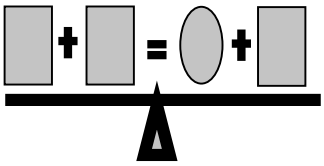
Bar Model	Decompose	Traditional
$5x+3+2x=7x!4$ 	$5x+3+2x=7x!4$	$5x+3+2x=7x!4$

"You Try" for Example 3: x $x!$ x

Balance Beam Game

This game can be played the day before teaching Solving variables on both sides to introduce the idea of removing from both sides.

Say, "Let's play a game" *Write on board.*



Say, "Can you tell me what circle is equal to?"
Answer, "One square"
"Fabulous!"

Discuss the "sides" of the balance and relate to the equal sign. Good time to review

Say, "Let's try this one." irccric, irc its td

**Optional if time allows or to have another example: Say, “Now let’s try one more.”
Write

Please note that this lesson is designed for a block schedule period. If you have a traditional period you complete this lesson over the course of two days.

You’ll notice throughout this lesson that we are working horizontally not vertically. We’ve seen that this alleviates many issues that come up.

We also want you to notice the common occurrences in all the three methods. Point them out to your students or have them point them out to you.

We want them to do the other methods so that they gain a better understanding of the traditional method. Over time we want them to do the traditional method.

Warm up

Debrief all problems except “other” this will be the beginning of the lesson.

Begin debriefing the last question

Write on board.

$2 + 3 = 20$ $x = x +$

Say

Say, "If we take that solution and substitute that into the second equation, we get"

BOARD

2 + 3 = 20

Variables are on the same side

=

=

x = *x* +

Variables on both sides

After sufficient time for students to complete and/or for you to circulate write the solution

Solution

Bar Model	Decompose	Traditional

4 8 5 3

+

		x	*x*	8

Example 2: $2x \quad 4 \quad x \quad 7$

Bar Model	Decompose	Traditional

$2x \quad 4 \quad x \quad 7$

+
$x + 7$

! x	4
x	7

x	! x	! x	4
x		7	

"You Try" for Example 2: $-2\ \ -4 = -3\ \ +3$

After sufficient time for students to complete and/or for you to circulate write the solution

Solution

Bar Model

$x \quad = \quad x +$

$2x \quad 4$
x

$-$	$-$	$!\ 4$	
$-$	$-$	$-$	3

$!\ 4$	3	3
$-$		3

-7	3
$-$	3

-7
$-$

$! \quad = !7$

$= 7$

Decompose

$x \quad = \quad x +$

$x \quad = \quad x + \quad x +$

$= \quad x +$

$+ \quad + \quad = \quad x +$

$+ \quad = \quad x$

$= \quad x$

$= x$

$x =$

Traditional

$2 \quad 4 \quad 3 \quad 3$

$2 \quad 3 \quad 4 \quad 3 \quad 3 \quad 3$

$4 \quad 3$

$4 \quad 4 \quad 3 \quad 4$

"You Try" for Example 3: $x \quad x! \quad x$

After sufficient time for students to complete and/or for you to circulate write the solution.

Solution

Bar Model	Decompose	Traditional

$x \quad x! \quad x$

$6 \quad 5$
$4 \quad !\,5+2$

x		5
$4x$	5	$2x$

x	5

x

Example 4: –

"You Try" for Example 4: x ! + x = x ! ! x

After sufficient time for students to complete and/or for you to circulate write the solution.

Solution

Bar Model	Decompose	Traditional

! ! !

$4x$	$2 + 3x$
11	2 4

	! 2	$3x$
$11x$		! 4

$4x + 3x$	! 2
$11x$ $4x$	

	! 2

"You Try" for Example 5: 2(3) 4 10

After sufficient time for students to complete and/or for you to circulate write the solution.

Solution

Bar Model **Decompose**

N**otice throughout this lesson that we are working horizontally not vertically. We've seen that this alleviates many of the issues that come up.**

Notice the common occurrences in all the three methods. Point them out to your students or have them point them out to you.

We want them to do the other methods so that they gain a better understanding of the traditional method. Over time we want them to do the traditional method.

NOTE:
Homework
To incorporate the multiple methods it is highly encouraged to assign fewer problems to be done multiple ways.