

Unit 2 Lesson 7: Explaining Steps for Rewriting Equations

1 Math Talk: Could It be Zero? (Warm up)

Student Task Statement

Is 0 a solution to each equation?

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

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

$$5x = \frac{1}{2}x$$

$$\frac{6}{x} + 1 = 8$$

2 Explaining Acceptable Moves

Student Task Statement

Here are some pairs of equations. While one partner listens, the other partner should:

- Choose a pair of equations from column A. Explain why, if x is a number that makes the first equation true, then it also makes the second equation true.
- Choose a pair of equations from column B. Explain why the second equation is no longer true for a value of x that makes the first equation true.

Then, switch roles until you run out of time or you run out of pairs of equations.

	A	B
1.	$16 = 4(9 - x)$ $16 = 36 - 4x$	$9x = 5x + 4$ $14x = 4$
2.	$5x = 24 + 2x$ $3x = 24$	$\frac{1}{2}x - 8 = 9$ $x - 8 = 18$
3.	$-3(2x + 9) = 12$ $2x + 9 = -4$	$6x - 6 = 3x$ $x - 1 = 3x$
4.	$5x = 3 - x$ $5x = -x + 3$	$-11(x - 2) = 8$ $x - 2 = 8 + 11$
5.	$18 = 3x - 6 + x$ $18 = 4x - 6$	$4 - 5x = 24$ $5x = 20$

3 It Doesn't Work!

Student Task Statement

Noah is having trouble solving two equations. In each case, he took steps that he thought were acceptable but ended up with statements that are clearly not true.

Analyze Noah's work on each equation and the moves he made. Were they acceptable moves? Why do you think he ended up with a false equation?

Discuss your observations with your group and be prepared to share your conclusions. If you get stuck, consider solving each equation.

1.

$$x + 6 = 4x + 1 - 3x$$

original equation

$$x + 6 = 4x - 3x + 1$$

apply the commutative property

$$x + 6 = x + 1$$

combine like terms

$$6 = 1$$

subtract x from each side

2.

$$2(5 + x) - 1 = 3x + 9$$

original equation

$$10 + 2x - 1 = 3x + 9$$

apply the distributive property

$$2x - 1 = 3x - 1$$

subtract 10 from each side

$$2x = 3x$$

add 1 to each side

$$2 = 3$$

divide each side by x