

4-4: Learning Goals

- Let's rewrite some more equations while keeping the same solutions.

4-4-1: Different Equations?

Equation 1

$$x - 3 = 2 - 4x$$

Which of these have the same solution as Equation 1? Be prepared to explain your reasoning.

Equation A

$$2x - 6 = 4 - 8x$$

Equation B

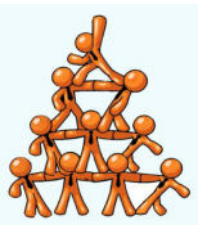
$$x - 5 = -4x$$

Equation C

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

Equation D

$$-3 = 2 - 5x$$



4-4-2: Step by Step by Step by Step

Here is an equation, and then all the steps Clare wrote to solve it:

$$\begin{aligned} 14x - 2x + 3 &= 3(5x + 9) \\ 12x + 3 &= 3(5x + 9) \\ 3(4x + 1) &= 3(5x + 9) \\ 4x + 1 &= 5x + 9 \\ 1 &= x + 9 \\ -8 &= x \end{aligned}$$

Here is the same equation, and the steps Lin wrote to solve it:

$$\begin{aligned} 14x - 2x + 3 &= 3(5x + 9) \\ 12x + 3 &= 3(5x + 9) \\ 12x + 3 &= 15x + 27 \\ 12x &= 15x + 24 \\ -3x &= 24 \\ x &= -8 \end{aligned}$$

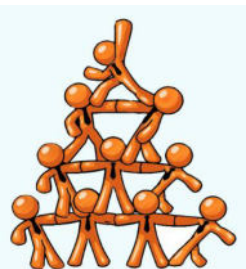
1. Are both of their *solutions* correct? Explain your reasoning.
2. Describe some ways the steps they took are alike and different.
3. Mai and Noah also solved the equation, but some of their steps have errors. Find the incorrect step in each solution and explain why it is incorrect.

Mai:

$$\begin{aligned} 14x - 2x + 3 &= 3(5x + 9) \\ 12x + 3 &= 3(5x + 9) \\ 7x + 3 &= 3(9) \\ 7x + 3 &= 27 \\ 7x &= 24 \\ x &= \frac{24}{7} \end{aligned}$$

Noah:

$$\begin{aligned} 14x - 2x + 3 &= 3(5x + 9) \\ 12x + 3 &= 15x + 27 \\ 27x + 3 &= 27 \\ 27x &= 24 \\ x &= \frac{24}{27} \end{aligned}$$



4-4-3: Make Your Own Steps

Solve these equations for x .

1. $\frac{12+6x}{3} = \frac{5-9}{2}$

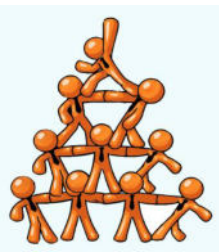
2. $x - 4 = \frac{1}{3}(6x - 54)$

3. $-(3x - 12) = 9x - 4$



4-4: Lesson Synthesis

- subtract a number from each side
- subtract $4x$ from each side
- dividing each side of the equation by 7
- adding $5x$ to one side and 10 to the other
- add 4 to one side and add 5 to the other



4-4: Learning Targets

- I can make sense of multiple ways to solve an equation.



4-4-4: Mis-Steps

Lin solved the equation $8(x - 3) + 7 = 2x(4 - 17)$ incorrectly. Find the errors in her solution. What should her answer have been?

Lin's solution:

$$8(x - 3) + 7 = 2x(4 - 17)$$

$$8(x - 3) + 7 = 2x(13)$$

$$8x - 24 + 7 = 26x$$

$$8x - 17 = 26x$$

$$-17 = 34x$$

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

