Solving Equations with Variables on Both Sides

Unit 1

Lesson 2

Essential Question: How is solving an equation with variables on both sides different from equations with variables on one side?

Answer on your response card.

Recall the steps for solving an equation.

Step 1: Use the distributive property to remove any parenthesis.

Step 2: Simplify the expression on each side.

Step 3: Use addition and subtraction to get the variable on one side and the constant on the other side.

Step 4: Use multiplication or division to solve.

* Multiply by the LCM of the denom *

Solve each equation below and check your solution.

$5a + 2 = 6 - 7a$

$+7a \quad +7a$

$12a + 2 = 6$

$-2 \quad -2$

$\frac{12a}{12} = \frac{4}{12} \div 4 = \frac{1}{3}$

$a = \frac{1}{3}$

$1.3c = 3.3c + 2.8$

$-3.3c \quad -3.3c$

$-2c = 2.8$

$\frac{-2c}{-2} = \frac{2.8}{-2}$

$c = -1.4$

$4\left[\frac{x}{2} + 1 = \frac{1}{4}x - 6\right]$

$2x + 4 = 1x - 24$

$-2x \quad -2x$

$4 = -1x - 24$

$+24 \quad +24$

$\frac{28}{-1} = \frac{-1x}{-1}$

$x = -28$

When solving equations that contain grouping symbols parenthesis**, first use the Distributive Property to eliminate grouping symbols. Then solve.**

$6(n-1) = 2(2n+4)$

$6n - 6 = 4n + 8$

$-6n \quad -6n$

$-6 = -2n + 8$

$-8 \quad -8$

$\frac{-14}{-2} = \frac{-2n}{-2}$

$7 = n$

$-2(w-1) + 4 = -4(w+1)$

$-2w + 2 + 4 = -4w - 4$

$-2w + 6 = -4w - 4$

$+4w \quad +4w$

$2w + 6 = -4$

$-6 \quad -6$

$\frac{2w}{2} = \frac{-10}{2}$

$w = -5$

$-\frac{1}{3}(x + 15) = 3(x - 1)$

$3\left[-\frac{1}{3}x - 5 = 3x - 3\right]$

$-1x - 15 = 9x - 9$

$x = -0.6$ or $-\frac{3}{5}$

Ex 7: The membership fee for joining a gardening association is $24 per year. A local botanical garden charges members of the gardening association $3 for admission to the garden. Nonmembers of the association are charged $6. After how many visits to the garden, is the total cost for members, including the membership fee, the same as the total cost for nonmembers?

Member = Nonmember

$24 + 3x = 6x$

x ↑ # of visits

$24 + 3x = 6x$

$-3x \quad -3x$

$\frac{24}{3} = \frac{3x}{3}$

8 visits = x

STAAR EOC Practice

What value of n makes the equation $4(0.5n - 3) = n - 0.25(12 - 8n)$ true?

F 3

G −9

H 0

J −15

$2n - 12 = n - 3 + 2n$

$2n - 12 = 3n - 3$

$-2n \quad -2n$

$-12 = n - 3$

$+3 \quad +3$

$-9 = n$