Essential Questions: How do we solve equations when variables appear on both sides of the equals sign? How do we solve equations in the form of a proportion?

Do Now: Solve for **x** and check your solution.

$8x + 2 = 2x - 22$

Let's Review

Solving Equations with Variables on Both Sides

How do we solve equations when variables appear on both sides of the equals sign?

1) Simplify each side of the equation as much as possible.
2) Bring variable terms to one side of the equation and constants to the other side of the equation using properties of equality.
3) Solve for the variable.
4) Check solution with the original equation.

Examples:

1. $3x - 4 = 9x$
2. $6x + 1 - 9x = 5 - x$
3. $2(x + 3) = 10 + x$

Solving Equations in the form of Proportions

What is a proportion?

A proportion is an equation that states that two ratios are equal. Ex: $\frac{4}{8}=\frac{1}{2}$

How do we solve proportions?

A proportion can be solved by cross multiplying. $\frac{a}{b}=\frac{c}{d} \rightarrow ad=cb$

Important: *Put all polynomial numerators and denominators in ( )*

Solve for x in each proportion. Check your solution.

4. $\frac{2}{3}=\frac{4x}{42}$

5. $\frac{x+1}{4}=\frac{5}{2}$

6. $\frac{2x+12}{x}=-4$

7. $\frac{x-4}{x+3}=\frac{2}{3}$

8. For the equation below, identify the property/process used in each step.

$25 + 10(12 - x) = 5(2x - 7)$

$25 + 120 - 10x = 10x - 35$ _____

$145 - 10x = 10x - 35$ _____

$-10x = 10x - 180$ _____

$-20x = -180$ _____

$x = 9$ _____

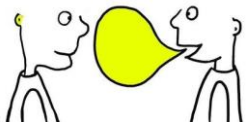
TODAY'S TAKE AWAY…

Proportions are equations that can be solved by _____ _____.

When solving equations with variables on both sides, it is necessary to bring the variables to _____of the equation and the constants to the other side.

Always check the _____ with the original equation.

Turn and Talk:



Is the following equation solved correctly? Explain the process that was used in the first step.

Given: -6 + 2x = 10 + 4x

$$\frac{-6 + 2x}{2} = \frac{10 + 4x}{2}$$

$-3 + x = 5 + 2x$

$-x \quad -x$

$-3 = 5 + x$

$-5 \quad -5$

$-8 = x$

8 Algebra CC **HW #_____**

Solve for the variable in each equation. Show all work. Check solutions with your calculator.

1) $-3.4r = 68$

2) $p - 12 = -3$

3) $\frac{2}{9}x = -14$

4) $-4x + 5 = -25$

5) $-2 + \frac{1}{4}x = -26$

6) $6 = 3(2a - 4)$

7) $3y = y + 12$

8) $\frac{x-2}{16} = \frac{x}{4}$

9) $4q - 7 = 8 - q$

10) $\frac{10-3x}{4} = 1$

11) $3(x + 4) - x = 8x - 18$

12) $7(b - 1) + 4 = 8(b + 5) - 20$