Warm Up

9/10

Solve for x:

$$5x - 4 + 2x = 10x + 15 + 3$$

Combine Like Terms

$7x - 4 = 10x + 18$

$+4 \qquad +4$

$7x = 10x + 22$

$-10x \quad -10x$

$-3x = 22$

$\frac{-3x}{-3} = \frac{22}{-3}$

$x = \frac{-22}{3}$

$7x - 4 = 10x + 18$

$-18 \qquad -18$

$7x - 22 = 10x$

$-7x \quad -7x$

$\frac{-22}{3} = \frac{3x}{3}$

$\frac{-22}{3} = x$

It doesn't matter what your first step is, as long as you do the same thing to both sides.

Solving Equations with Variables on Both Sides. Date_____

Homework Questions?

Solve each equation.

1) $7 + 5r + 3 + 5 = 1 + 7r$

$15 + 5r = 1 + 7r$
$-1 \quad -1$
$14 + 5r = 7r$
$-5r \quad -5r$
$\frac{14}{2} = \frac{2r}{2}$
$7 = r$

2) $-4 + 6k + 8k = -4 - 7k$

$-4 + 14k = -4 - 7k$
$+4 \quad +4$
$14k = -7k$
$-7k \quad -7k$
$\frac{7k}{7} = \frac{0}{7}$
$k = 0$

3) $8n - 7 = 7n - 14$

$-7n \quad -7n$
$n - 7 = -14$
$+7 \quad +7$
$n = -7$

4) $-7b - 14 = -5b - 4b$

$-7b - 14 = -9b$
$+7b \quad +7b$
$\frac{-14}{-2} = \frac{-2b}{-2}$
$7 = b$

5) $8 + 7n = 6n + 2n$

$8 + 7n = 8n$
$-7n \quad -7n$
$8 = n$

6) $2 - 2n - 2n = -5 - 3n$

$2 - 4n = -5 - 3n$
$+4n \quad +4n$
$2 = -5 + n$
$+5 \quad +5$
$7 = n$

7) $7x = 3x + 4x$

$\frac{7x}{7} = \frac{7x}{7}$ OR $7x = 7x$
$x = x$ $-7x \quad -7x$
$0 = 0$

Infinite Solutions

8) $4 + 7x = 8x - 2x$

$4 + 7x = 6x$
$-7x \quad -7x$
$\frac{4}{-1} = \frac{-x}{-1}$
$-4 = x$

9) $2 + 7n = -4 + 5n$

$-2 \quad -2$
$7n = -6 + 5n$
$-5n \quad -5n$
$\frac{2n}{2} = \frac{-6}{2}$
$n = -3$

10) $-7 - 3a = 1 - 4a$

$+7 \quad +7$
$-3a = 8 - 4a$
$+4a \quad +4a$
$a = 8$

Homework Questions?

Solving Equations with Variables on Both Sides Date_____

Solve each equation.

1) $7 + 5r + 3 + 5 = 1 + 7r$

2) $-4 + 6k + 8k = -4 - 7k$

3) $8n - 7 = 7n - 14$

4) $-7b - 14 = -5b - 4b$

5) $8 + 7n = 6n + 2n$

6) $2 - 2n - 2n = -5 - 3n$

7) $7x = 3x + 4x$

What is the value of x to make this balance?

$\frac{7x}{7} = \frac{7x}{7}$

$x = x$

$0 = 0$ ← true statements

infinite # of solutions

8) $4 + 7x = 8x - 2x$

9) $2 + 7n = -4 + 5n$

10) $-7 - 3a = 1 - 4a$

What about this?

$$2(3x - 5) = 8$$

What's different?

parenthesis

Make sure all numbers and variables are **free** before applying any properties of equality.

$2(3x \boxed{- 5}) = 8$

sign always sticks with the number it is in front of.

Use Distributive property to EXPAND

$6x - 10 = 8$

$+10 \quad +10$

$\frac{6x}{6} = \frac{18}{6}$

$x = 3$

How to check your work:

$x = 3$

$2(3x - 5) = 8$

If x actually = 3 the equation will be balanced

$2(3(3) - 5) \stackrel{?}{=} 8$

$2(9 - 5) \stackrel{?}{=} 8$

$2(4) \stackrel{?}{=} 8$

$8 = 8$ ✓

The equation balances when $x = 3$, so that is the solution

Practice

$$2(3a+2) = -8$$

$6a + 4 = -8$

$-4 \quad -4$

$\frac{6a}{6} = \frac{-12}{6}$

$x = -2$

Practice

What's different?

$$-2(x-3)=30$$

negative # in front

$$-2(x-3)=30$$

$$-2x+6=30$$
$$-6 \quad -6$$

$$\frac{-2x}{-2}=\frac{24}{-2}$$

$$x=-12$$

Practice

What's different?

$$-(3k-12)=48$$

What the heck is this?!

There is actually a number there!

$$-1(3k-12)=48$$

$$-3K+12=48$$

$$-12 \quad -12$$

$$\frac{-3K}{-3}=\frac{36}{-3}$$

$$\boxed{K=-12}$$

Practice

What's different?

$$5 - 3(x + 4) = 18$$

something before we use distributive property

$$5 - 3(x + 4) = 18$$

$$5 - 3x - 12 = 18$$

Like terms

$$-7 - 3x = 18$$

$$+7 \qquad +7$$

$$\frac{-3x}{-3} = \frac{25}{-3}$$

$$x = \frac{-25}{3}$$

Classwork:

1. $18 = 3(3x - 6)$

2. $30 = -5(6n + 6)$

3. $37 = -3 + 5(x + 6)$

4. $4(-x+4)=12$

5. $-2 = -(n - 8)$

Finish up the practice worksheet.

Procedure for solving for x:

- "Free up" all numbers and variables.
  (Remove parenthesis by using the distributive property.)
- Combine like terms (if any) on each side.
- Use properties of equality to isolate x.

Don't forget to:

- Show all work
- Use transformation lines.

Homework

Finish classwork