

Warm Up

9/11

Solve for x:

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

$$\begin{array}{r} 7x - 4 = 10x + 17 \\ +4 \qquad +4 \\ \hline 7x = 10x + 21 \\ -10x \quad -10x \\ \hline -3x = 21 \\ \underline{-3} \quad \underline{-3} \\ x = -7 \end{array}$$

What if I start by subtracting 7x instead of adding 4?

$$\begin{array}{r} 7x - 4 = 10x + 17 \\ -7x \quad -7x \\ \hline -4 = 3x + 17 \\ -17 \quad -17 \\ \hline -21 = 3x \\ \underline{3} \quad \underline{3} \\ -7 = x \end{array}$$

Homework Questions?

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

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

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

$$\begin{array}{r} -4 + 14k = -4 - 7k \\ +4 \quad +4 \\ \hline 14k = -7k \\ -7k \quad -7k \\ \hline 7k = 0 \\ \frac{7k}{7} = \frac{0}{7} \\ k = 0 \end{array}$$

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

$$\begin{array}{r} -7n \quad -7n \\ \hline n - 7 = -14 \\ +7 \quad +7 \\ \hline n = -7 \end{array}$$

$$\begin{array}{r} -n = 7 \\ -1 \quad -1 \\ \hline n = -7 \end{array}$$

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

$$\begin{array}{r} -7b - 14 = -9b \\ +7b \quad +7b \\ \hline -14 = -2b \\ -2 \quad -2 \\ \hline 7 = b \end{array}$$

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

$$\begin{array}{r} 8 + 7n = 8n \\ -7n \quad -7n \\ \hline 8 = n \end{array}$$

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

$$\begin{array}{r} 2 - 4n = -5 - 3n \\ +4n \quad +4n \\ \hline 2 = -5 + n \\ +5 \quad +5 \\ \hline 7 = n \end{array}$$

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

$$\begin{array}{r} 7x = 7x \\ \frac{7x}{7} = \frac{7x}{7} \quad \text{or} \quad \frac{7x}{-7x} = \frac{7x}{-7x} \\ x = x \quad \quad \quad 0 = 0 \end{array}$$

Infinite Solutions

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

$$\begin{array}{r} 4 + 7x = 6x \\ -7x \quad -7x \\ \hline 4 = -x \\ -1 \quad -1 \\ \hline -4 = x \end{array}$$

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

$$\begin{array}{r} -2 \quad -2 \\ \hline 7n = -6 + 5n \\ -5n \quad -5n \\ \hline 2n = -6 \\ \frac{2n}{2} = \frac{-6}{2} \\ n = -3 \end{array}$$

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

$$\begin{array}{r} +7 \quad +7 \\ \hline -3a = 8 - 4a \\ +4a \quad +4a \\ \hline a = 8 \end{array}$$

What about this? What's different?

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

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

Distributive Property

$$2(3x - 5) = 8$$
$$6x - 10 = 8$$
$$\begin{array}{r} +10 \quad +10 \\ \hline 6x = 18 \\ \hline 6 \quad 6 \\ x = 3 \end{array}$$

How to check your work:

$$x = 3$$

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

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

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

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

$$8 = 8 \checkmark$$

If x actually = 3
the equation will
be balanced

Practice

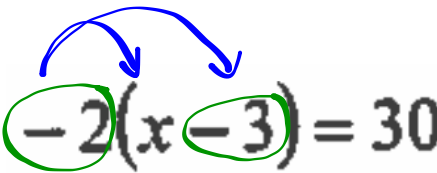
$$2(3a + 2) = -8$$

$$6a + 4 = -8$$

$$\begin{array}{r} 6a + 4 = -8 \\ -4 \quad -4 \\ \hline 6a = -12 \\ \frac{6a}{6} = \frac{-12}{6} \end{array}$$

$$a = -2$$

Practice

$$\textcircled{-2}(\textcircled{x-3}) = 30$$


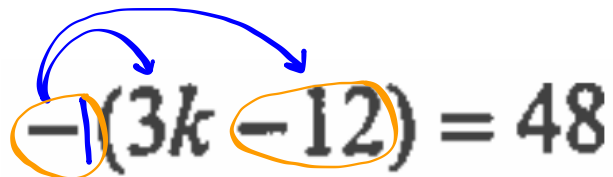
$$\begin{array}{r} -2x + 6 = 30 \\ -6 \quad -6 \\ \hline \end{array}$$

$$\begin{array}{r} -2x = 24 \\ \hline -2 \quad -2 \end{array}$$

$$x = -12$$

Practice

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


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

$$-3k + 12 = 48$$

$$\begin{array}{r} -12 \quad -12 \\ \hline \end{array}$$

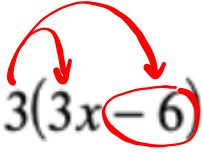
$$-3k = 36$$

$$\begin{array}{r} \underline{-3} \quad \underline{-3} \end{array}$$

$$k = -12$$

Classwork:

1.

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


2.

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

3.

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

$$37 = -3 + 5x + 30$$

You must distribute first!

No $-3 + 5$!!

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.