

Solve the following:

$$7x + 19 = -2x + 55$$

$$\begin{array}{r} +2x \qquad \qquad +2x \\ \hline \end{array}$$

$$9x + 19 = 55$$

$$\begin{array}{r} -19 \quad -19 \\ \hline \end{array}$$

$$\frac{9x}{9} = \frac{36}{9}$$

$$x = 4$$

Solve each of the following:

1. $6x + 22 = -3x + 31$

$$\begin{array}{r} +3x \qquad \qquad +3x \\ \hline 9x + 22 = 31 \\ -22 \quad -22 \\ \hline 9x = 9 \\ \frac{9x}{9} = \frac{9}{9} \\ x = 1 \end{array}$$

2. $64 - 12w = 6w$

$$\begin{array}{r} +12w \quad +12w \\ \hline 64 = 18w \\ \frac{64}{18} = \frac{18w}{18} \\ \frac{32}{9} = w \end{array}$$

Solve each of the following:

3. $5x - 16 + 2x = 9x - 15$

$$\begin{array}{r} 7x - 16 = 9x - 15 \\ -7x \quad -7x \\ \hline -16 = 2x - 15 \\ +15 \quad +15 \\ \hline -1 = 2x \\ \frac{-1}{2} = \frac{2x}{2} \end{array} \quad x = -\frac{1}{2}$$

4. $3(x + 2) = 2x + 4$

$$\begin{array}{r} 3x + 6 = 2x + 4 \\ -2x \quad -2x \\ \hline x + 6 = 4 \\ -6 \quad -6 \\ \hline x = -2 \end{array}$$

Solve each of the following:

5. $2(x + 4) = x + 8$

$$\begin{array}{r} 2x + 8 = x + 8 \\ -x \quad -x \\ \hline x + 8 = 8 \\ -8 \quad -8 \\ \hline x = 0 \end{array}$$

6. $5(x + 3) = 4x + 5$

$$\begin{array}{r} 5x + 15 = 4x + 5 \\ -4x \quad -4x \\ \hline x + 15 = 5 \\ -15 \quad -15 \\ \hline x = -10 \end{array}$$

Let's look at this example together:

$$\begin{array}{r} 3(x+2) = 3x + 4 \\ 3x + 6 = 3x + 4 \\ \underline{-3x \quad -3x} \\ 6 = 4 \quad \text{what??} \end{array}$$

* When you are solving an equation and you get to a statement that is false, it means the equation has No Solution!

Let's look at another example together:

$$\begin{array}{r} 3(x+2) = 3x + 6 \\ 3x + 6 = 3x + 6 \\ \underline{-3x \quad -3x} \\ 6 = 6 \end{array}$$

Now what??

* When you are solving an equation and you get to a statement that is true, it means that x could be all real numbers.

This kind of equation is called an Identity.

Solve each of the following:

7. $2(x + 4) = 2x + 8$

$$\begin{array}{r} 2x + 8 = 2x + 8 \\ -2x \quad -2x \\ \hline \end{array}$$

$$8 = 8$$

Identity

8. $5(x + 3) = 5x + 3$

$$\begin{array}{r} 5x + 15 = 5x + 3 \\ -5x \quad -5x \\ \hline \end{array}$$

$$15 = 3$$

No Solution

Solve each of the following:

9. $2(x + 4) = 2x - 8$

$$\begin{array}{r} 2x + 8 = 2x - 8 \\ -2x \quad -2x \\ \hline 8 = -8 \end{array} \quad \text{No Solution}$$

10. $5(x + 3) = 5x + 15$

$$\begin{array}{r} 5x + 15 = 5x + 15 \\ -5x \quad -5x \\ \hline 15 = 15 \end{array} \quad \text{Identity}$$

Solve each of the following:

11. $7x + 3 = 2x - 2$

$$\begin{array}{r} -2x \qquad -2x \\ \hline 5x + 3 = -2 \\ -3 \qquad -3 \\ \hline 5x = -5 \\ \frac{5x}{5} = \frac{-5}{5} \\ x = -1 \end{array}$$

12. $5(x - 5) = 5x + 24$

$$\begin{array}{r} 5x - 25 = 5x + 24 \\ -5x \qquad -5x \\ \hline -25 = 24 \end{array}$$

No solution

Solve each of the following:

13. $12 - 5a = -2a - 9$

$$\begin{array}{r} + 2a + 2a \\ \hline 12 - 3a = -9 \\ -12 -12 \\ \hline -3a = -21 \\ \frac{-3a}{-3} = \frac{-21}{-3} \quad a = 7 \end{array}$$

14. $3(4c + 7) = 12c$

$$\begin{array}{r} 12c + 21 = 12c \\ -12c -12c \\ \hline 21 = 0 \end{array} \quad \text{No Solution}$$

Solve each of the following:

15. $x - 2x + 3 = 3 - x$

$$\begin{array}{r} -x + 3 = 3 - x \\ +x \qquad \qquad +x \\ \hline 3 = 3 \end{array}$$

Identity

16. $6y - 3y + 6 = 5y - 4$

$$\begin{array}{r} 3y + 6 = 5y - 4 \\ -3y \qquad \qquad -3y \\ \hline 6 = 2y - 4 \\ +4 \qquad \qquad +4 \\ \hline 10 = 2y \\ \frac{10}{2} = \frac{2y}{2} \end{array}$$

$$y = 5$$