

LESSON 2-4 Solving Equations with the Variable on Each Side

I can... solve equations with variables on both sides of the equation.

1. Distribute (if necessary)
2. Combine like terms (if necessary)
3. Get variables on the same side (additive inverse)
4. Solve.
5. Verify (Plug it in, Plug it in)

Solve. Check your solution.

Name the property

$$\begin{array}{r|l}
 9f - 6 = 3f + 7 & \\
 \hline
 -3f & -3f \\
 \hline
 6f - 6 = 7 & \\
 +6 & +6 \\
 \hline
 \frac{6f}{6} = \frac{13}{6} & \\
 \boxed{f = \frac{13}{6}} &
 \end{array}$$

Add Inv.

Add Inv.

Mult Inv.

Watch
Only!!

$$\begin{aligned}
 9\left(\frac{13}{6}\right) - 6 &= 3\left(\frac{13}{6}\right) + 7 \\
 13.5 &= 13.5
 \end{aligned}$$

Solve. Check your solution.

Name the property

1. $8 + 5c = 7c - 2$

$$\begin{array}{r|l} -5c & -5c \\ \hline 8 & = 2c - 2 \end{array} \quad \text{Add Inv.}$$

$$\begin{array}{r|l} 8 & = 2c - 2 \\ +2 & +2 \\ \hline 10 & = 2c \end{array} \quad \text{Add Inv.}$$

$$\frac{1}{2} \cdot 10 = 2c \cdot \frac{1}{2} \quad \text{Mult Inv}$$

$$\frac{10}{2} = c$$

$$5 = c$$

$$c = 5 \checkmark$$

Symmetric Prop.

check

$$8 + 5(5) = 7(5) - 2$$

$$33 = 33$$

Solve. Check your solution.

Name the properties

$$\frac{x}{2} = \frac{1}{2}x$$

2. $\frac{x}{2} + 1 = \frac{1}{4}x - 6$

$$\frac{1}{2}x + 1 = \frac{1}{4}x - 6$$

$$\begin{array}{r|l} -\frac{1}{4}x & -\frac{1}{4}x \\ \hline \frac{1}{4}x + 1 & = -6 \end{array} \quad \text{add Inv}$$

$$\begin{array}{r|l} \frac{1}{4}x + 1 & = -6 \\ -1 & -1 \\ \hline \frac{1}{4}x & = -7 \end{array} \quad \text{add Inv.}$$

$$\frac{4}{1} \cdot \frac{1}{4}x = -7 \cdot \frac{4}{1} \quad \text{Mult Inv.}$$

$$x = -28 \checkmark$$

$$2. \frac{1}{2} - \frac{1}{4}$$

$$\frac{2}{4} - \frac{1}{4} = \frac{1}{4}$$

check:

$$\frac{-28}{2} + 1 = \frac{1}{4}(-28) - 6$$

$$-13 = -13$$

You Try!

White Boards

3. $3w + 2 = 7w$ $\frac{1}{2}$



4. $5a + 2 = 6 - 7a$ $\frac{1}{3}$



Special Solutions

One Solution: You can get variable alone.
 $2x = 10$
 $x = 5$ It only works for 1 answer.
 $x = 3$ $-7 = m$ $k = 7$

No Solution: Impossible to get a correct solution.

$$\begin{array}{r} x + 7 = x + 2 \\ -x \quad -x \\ \hline 7 \neq 2 \end{array} \quad \begin{array}{l} -5 = 1 \\ 0 = 3 \end{array} \quad \begin{array}{l} \text{when solving:} \\ \text{Variable disappears} \\ \text{False Statement} \end{array}$$

All Real Numbers: Any number will work!

$$\begin{array}{r} 2x + 5 = 2x + 5 \\ -2x \quad -2x \\ \hline 5 = 5 \end{array} \quad \begin{array}{l} 3 = 3 \\ -7 = -7 \end{array} \quad \begin{array}{l} \text{when solving:} \\ \text{Variables disappear} \\ \text{True Statement} \end{array}$$

5. Solve $8(5c - 2) = 10(32 + 4c)$. Dist. Prop.

$$8 \cdot 5c - 8 \cdot 2 \quad | \quad 10 \cdot 32 + 10 \cdot 4c$$

$$\begin{array}{r|l} \cancel{40c} - 16 & = 320 + 40c \\ -40c & \quad \quad \quad -40c \end{array} \quad \text{Add Inv.}$$

$$-16 = 320$$

NO SOLUTION.

6. Solve $\frac{1}{7}(21c - 56) = 3\left(c - \frac{8}{3}\right)$.

$$\frac{1}{7} \cdot 21c + \frac{1}{7}(-56) = 3 \cdot c + 3\left(-\frac{8}{3}\right)$$

$$\frac{\cancel{21}}{7}c + \frac{-56}{7} = 3c - \frac{24}{3}$$

$$\begin{array}{r|l} \cancel{3c} - 8 & = \cancel{3c} - 8 \\ -3c & \quad \quad \quad -3c \end{array}$$

$$-8 = -8$$

All Real Numbers

You TRY!

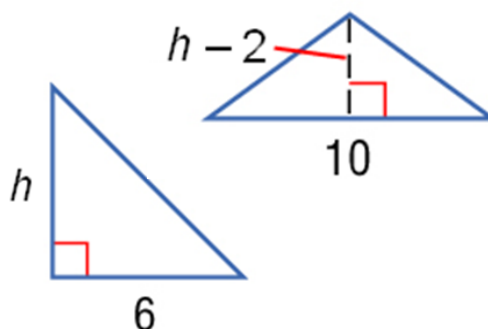
Solve and name the type of solution.

$$7. \quad 4(t + 20) = \frac{1}{5}(20t + 400).$$

$$8. \quad \frac{1}{3}(18 + 12q) = 6(2q - 7)$$

9. Find the value of x so that the figures have the same area.

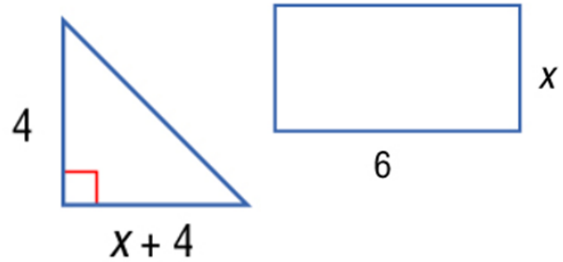
Area of a Triangle = $\frac{1}{2}bh$



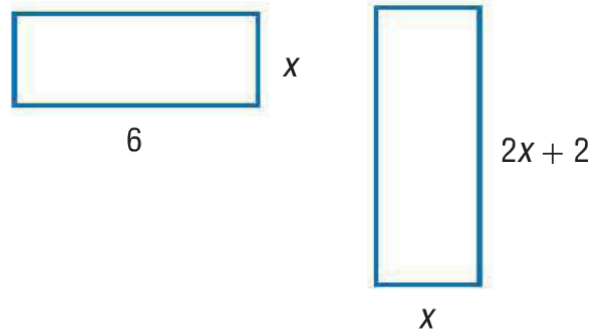
10. Find the value of x so that the figures have the same area.

Area of a Triangle = $\frac{1}{2}bh$

Area of a Rectangle = bh



11. Find the value of x so that the figures have the same perimeter.



Homework 2.4

Pg. 100

#11-21o, 22-36