

12-7-17

Aim: SWBAT solve and check two-step equations and solve literal equations.

HW: Packet Pages 6 - 7

Do Now: Packet Page 4 # 1 - 4

Homework - Solving one step equations and one step literal equations

Solve each equation algebraically and check using a 3-step check

$$\begin{array}{r}
 1) \quad x - 13 = -48 \\
 \quad +13 \quad +13 \\
 \hline
 x = -35
 \end{array}
 \quad
 \begin{array}{r}
 x - 13 = -48 \\
 \quad \quad \quad ? \\
 -35 - 13 = -48 \\
 -48 = -48
 \end{array}$$

$$\begin{array}{r}
 2) \quad x + 26 = -13 \\
 \quad -26 \quad -26 \\
 \hline
 x = -39
 \end{array}
 \quad
 \begin{array}{r}
 x + 26 = -13 \\
 \quad \quad \quad ? \\
 -39 + 26 = -13 \\
 -13 = -13
 \end{array}$$

$$\begin{array}{r}
 3) \quad \frac{x}{-8} = -24 \\
 \quad \quad \quad \cdot \frac{-8}{-8} \\
 \hline
 x = 192
 \end{array}
 \quad
 \begin{array}{r}
 \frac{x}{-8} = -24 \\
 \quad \quad \quad ? \\
 \frac{192}{-8} = -24 \\
 -24 = -24
 \end{array}$$

$$\begin{array}{r}
 4) \quad -7x = 56 \\
 \quad \quad \quad \cdot \frac{-1}{-1} \\
 \hline
 x = -8
 \end{array}
 \quad
 \begin{array}{r}
 -7x = 56 \\
 \quad \quad \quad ? \\
 (-7)(-8) = 56 \\
 56 = 56
 \end{array}$$

Solve each of the following for the indicated variable.

$$\begin{array}{r}
 5) \text{ Solve for } w: w + r = 5 - 3r \\
 \quad \quad \quad -r \quad -r \\
 \hline
 w = -4r + 5
 \end{array}$$

$$\begin{array}{r}
 6) \text{ Solve for } w: V = lwh \\
 \quad \quad \quad \frac{V}{lh} \quad \frac{V}{lh} \\
 \hline
 w = \frac{V}{lh}
 \end{array}$$

$$\begin{array}{r}
 7) \text{ Solve for } t: I = prt \\
 \quad \quad \quad \frac{I}{pr} \quad \frac{I}{pr} \\
 \hline
 t = \frac{I}{pr}
 \end{array}$$

$$\begin{array}{r}
 8) \text{ Solve for } x: x + c = 2b \\
 \quad \quad \quad -c \quad -c \\
 \hline
 x = 2b - c
 \end{array}$$

$$\begin{array}{r}
 9) \text{ Solve for } x: 3a = 2c + x \\
 \quad \quad \quad -2c \quad -2c \\
 \hline
 3a - 2c = x
 \end{array}$$

$$\begin{array}{r}
 10) \text{ Solve for } x: 4c + x = a \\
 \quad \quad \quad -4c \quad -4c \\
 \hline
 x = a - 4c
 \end{array}$$

$$\begin{array}{r}
 11) \text{ Solve for } x: \frac{bx}{a} = \frac{2cd}{b} \\
 \quad \quad \quad \frac{bx}{a} \cdot \frac{a}{a} \\
 \hline
 x = \frac{2acd}{b}
 \end{array}$$

$$\begin{array}{l}
 \frac{8}{3} = \frac{3x}{3} \\
 \frac{8}{3} = x \\
 8 = 3x \\
 8 = \frac{3}{1} \cdot \frac{8}{3} \\
 8 = 8
 \end{array}$$

How to Play the Equations Game

#1 Eliminating numbers on the same side as the variable

- Constants eliminate with opposite sign *(need to make 0)*
- Coefficients eliminate with division of the coefficient
- Denominators eliminate with multiplication of the denominator
- Fractional Coefficients eliminate with multiplication of the reciprocal

*need to
make 1
sign stays
the same*

#2 Variable terms eliminate with opposite sign

#3 Two-Step Equations

- i. Eliminate the constant
- ii. Eliminate the coefficient or denominator

#4 Entire side as a fraction

- i. Eliminate the denominator

#5 Distributive Property and Combining Like Terms Equations

- i. Simplify before you solve
 - Eliminate parentheses
 - Combine Like Terms

#6 Variables on Both Sides Equations

- i. Eliminate a variable term

Checking an Equation

- i. Rewrite the original equation
- ii. Substitute the answer for the variable
- iii. Evaluate until sides match using the Order of Operations

Step iii repeats as long as it takes.

AIM: SWBAT solve 2-step equations and literal equations algebraically and check using a 3-Step Check.

Do Now: Solve. Check #4 Only.

$$1) \quad x + 29 = 59$$

$$\begin{array}{r} -29 \quad -29 \\ \hline x = 30 \end{array}$$

$$2) \quad n - 12 = 25$$

$$\begin{array}{r} +12 \quad +12 \\ \hline n = 37 \end{array}$$

$$3) \quad -8x = -96$$

$$\begin{array}{r} -8 \quad -8 \\ \hline x = 12 \end{array}$$

$$4) \quad \frac{x}{-12} = 3 \cdot \frac{-12}{1}$$

$$x = -36$$

$$\frac{x}{-12} = 3$$

$$\frac{-36}{-12} = 3$$

$$3 = 3$$

SOLVING 2-STEP EQUATIONS

Goal: Get the variable by itself.

What separates one side of the equation from the other side? =

I) Simplify each side of the equation. (no parentheses, no like terms)

II) Get variable terms on one side and the constant term on the other side.
(Opposite side use opposite operations.)

III) Solve for the variable by using the inverse (opposite) operation.

Practice Problems:

Example 1:

Solve and Check

$$5d + 17 = 67$$

$$\begin{array}{r} -17 \quad -17 \\ \hline 5d = 50 \\ \hline d = 10 \end{array}$$

$$5d + 17 = 67$$

$$5 \cdot 10 + 17 \stackrel{?}{=} 67$$

$$50 + 17 = 67$$

$$67 = 67$$

Literal Equation

Solve for x: $2x + y = 6$

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

Example 2:

Solve

$$\begin{array}{r}
 -15y - 16 = 59 \\
 +16 \quad +16 \\
 \hline
 -15y = 75 \\
 \frac{-15y}{-15} = \frac{75}{-15} \\
 y = -5
 \end{array}$$

Example 3:

Solve

$$\begin{array}{r}
 \frac{n}{2} + 6 = 12 \\
 -6 \quad -6 \\
 \hline
 \frac{n}{2} = 6 \\
 \frac{2}{1} \cdot \frac{n}{2} = 6 \cdot \frac{2}{1} \\
 n = 12
 \end{array}$$

Example 4:

Solve

$$\begin{array}{r}
 \frac{2}{1} \cdot \frac{n+6}{2} = 12 \cdot \frac{2}{1} \\
 \hline
 n+6 = 24 \\
 -6 \quad -6 \\
 \hline
 n = 18
 \end{array}$$

Literal Equation

Solve for y: $-3y - x = b$

$$\begin{array}{r}
 -3y - x = b \\
 +x \quad +x \\
 \hline
 -3y = b+x \\
 \frac{-3y}{-3} = \frac{b+x}{-3} \\
 y = \frac{b+x}{-3}
 \end{array}$$

Literal Equation

Solve for h: $\frac{h}{2} + d = A$

$$\begin{array}{r}
 \frac{h}{2} + d = A \\
 -d \quad -d \\
 \hline
 \frac{h}{2} = (A-d) \\
 \frac{2}{1} \cdot \frac{h}{2} = (A-d) \cdot 2 \\
 h = 2A - 2d
 \end{array}$$

Literal Equation

Solve for x: $\frac{a+x}{1} = L \cdot \frac{4}{1}$

$$\begin{array}{r}
 a+x = 4L \\
 -a \quad -a \\
 \hline
 x = -a + 4L
 \end{array}$$

You Try! Solve each of the following for the indicated variable.

1) Solve for w: $P = 2l + 2w$

$$\begin{array}{r}
 P = 2l + 2w \\
 -2l \quad -2l \\
 \hline
 -2l + P = 2w \\
 \frac{-2l + P}{2} = \frac{2w}{2} \\
 \frac{-2l + P}{2} = w \\
 \text{or} \\
 -l + \frac{P}{2} = w
 \end{array}$$

2) Solve for b: $A = \frac{bh}{2}$

$$\begin{array}{r}
 A = \frac{bh}{2} \\
 \frac{2A}{h} = \frac{bh}{h} \\
 \frac{2A}{h} = b
 \end{array}$$

Homework - Solving two-step equations and two-step literal equations

Solve each equation algebraically and check using a 3-step check

1) $2x - 3 = 1$

$$\begin{array}{r} \star 2) \quad -x + 4 = 1 \\ \quad \quad \quad \underline{-4 \quad -4} \\ \quad \quad \quad -x = -3 \\ \quad \quad \quad \underline{-1 \quad -1} \\ \quad \quad \quad x = 3 \end{array}$$

3) $-3x + 6 = 12$

4) $-9 = -2y - 1$

5) $7y - 4 = -11$

6) $-9 = 7 - x$

7) $\frac{3}{2}a - 8 = 7$

8) $\frac{x}{8} - 6 = -12$

9) $\frac{x - 7}{5} = -3$

10) $\frac{a + 3}{5} = -11$

Solve each of the following for the indicated variable.

11) Solve for x : $3a = 2c - x$

12) Solve for l : $P = 2l + 2w$

13) Solve for m : $y = mx + b$

14) Solve for x : $\frac{x}{y} - z = a$

15) Solve for x : $\frac{x - m}{g} = T$

16) Solve for y : $2x + 3y = 7$