

12-8-17

Aim: SWBAT translate phrases into equations and continue to solve and check one-step and two-step equations.

HW: Packet Pages 10

Quiz Tuesday 1 and 2-step

Do Now: Packet Page 8

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

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

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

$2x - 3 = 1$   
 $2 \cdot 2 - 3 \stackrel{?}{=} 1$   
 $4 - 3 \stackrel{?}{=} 1$   
 $1 = 1$

★ 2)  $-x + 4 = 1$   
 $\begin{array}{r} -x + 4 = 1 \\ (-1)(3) + 4 \stackrel{?}{=} 1 \\ -3 + 4 \stackrel{?}{=} 1 \\ 1 = 1 \end{array}$   
 $\left[ \begin{array}{r} -x = -3 \\ \div -1 \quad \div -1 \\ \hline x = 3 \end{array} \right.$

3)  $-3x + 6 = 12$   
 $\begin{array}{r} -3x + 6 = 12 \\ -6 \quad -6 \\ \hline -3x = 6 \\ \div -3 \quad \div -3 \\ \hline x = -2 \end{array}$

$-3x + 6 = 12$   
 $(-3)(-2) + 6 \stackrel{?}{=} 12$   
 $6 + 6 \stackrel{?}{=} 12$   
 $12 = 12$

4)  $-9 = -2y - 1$   
 $\begin{array}{r} -9 = -2y - 1 \\ +1 \quad +1 \\ \hline -8 = -2y \\ \div -2 \quad \div -2 \\ \hline 4 = y \end{array}$   
 $-9 = -2y - 1$   
 $-9 \stackrel{?}{=} -2 \cdot 4 - 1$   
 $-9 \stackrel{?}{=} -8 - 1$   
 $-9 = -9$

5)  $7y - 4 = -11$   
 $\begin{array}{r} 7y - 4 = -11 \\ +4 \quad +4 \\ \hline 7y = -7 \\ \div 7 \quad \div 7 \\ \hline y = -1 \end{array}$

$7y - 4 = -11$   
 $(7)(-1) - 4 \stackrel{?}{=} -11$   
 $-7 - 4 \stackrel{?}{=} -11$   
 $-11 = -11$

6)  $-9 = 7 - x$   
 $\begin{array}{r} -9 = 7 - x \\ -7 \quad -7 \\ \hline -16 = -x \\ \div -1 \quad \div -1 \\ \hline 16 = x \end{array}$   
 $-9 = 7 - x$   
 $-9 \stackrel{?}{=} 7 - 16$   
 $-9 = -9$

★ 7)  $\frac{3}{2}a - 8 = 7$   
 $\begin{array}{r} \frac{3}{2}a - 8 = 7 \\ +8 \quad +8 \\ \hline \frac{3}{2}a = 15 \\ \cdot \frac{2}{3} \quad \cdot \frac{2}{3} \\ \hline a = 10 \end{array}$

$\frac{3}{2}a - 8 = 7$   
 $\frac{3}{2} \cdot 10 - 8 \stackrel{?}{=} 7$   
 $15 - 8 \stackrel{?}{=} 7$   
 $7 = 7$

8)  $\frac{x}{8} - 6 = -12$   
 $\begin{array}{r} \frac{x}{8} - 6 = -12 \\ +6 \quad +6 \\ \hline \frac{x}{8} = -6 \\ \cdot 8 \quad \cdot 8 \\ \hline x = -48 \end{array}$   
 $\frac{x}{8} - 6 = -12$   
 $\frac{-48}{8} - 6 \stackrel{?}{=} -12$   
 $-6 - 6 \stackrel{?}{=} -12$   
 $-12 = -12$

9)  $\frac{x-7}{5} = -3$   
 $\begin{array}{r} \frac{x-7}{5} = -3 \\ \cdot 5 \quad \cdot 5 \\ \hline x-7 = -15 \\ +7 \quad +7 \\ \hline x = -8 \end{array}$

$\frac{x-7}{5} = -3$   
 $\frac{-8-7}{5} \stackrel{?}{=} -3$   
 $\frac{-15}{5} \stackrel{?}{=} -3$   
 $-3 = -3$

10)  $\frac{a+3}{5} = -11$   
 $\begin{array}{r} \frac{a+3}{5} = -11 \\ \cdot 5 \quad \cdot 5 \\ \hline a+3 = -55 \\ -3 \quad -3 \\ \hline a = -58 \end{array}$   
 $\frac{a+3}{5} = -11$   
 $\frac{-58+3}{5} \stackrel{?}{=} -11$   
 $\frac{-55}{5} \stackrel{?}{=} -11$   
 $-11 = -11$

Solve each of the following for the indicated variable.

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

$$\begin{array}{r} -2c \quad -2c \\ \hline 3a - 2c = -x \\ -1 \quad -1 \\ \hline -3a + 2c = x \end{array}$$

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

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

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

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

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

$$\begin{array}{r} +z \quad +z \\ \hline \frac{x}{y} - z = a \\ \frac{x}{y} = (a + z) \cdot y \\ x = ay + yz \end{array}$$

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

$$\begin{array}{r} x - m = Tg \\ +m \quad +m \\ \hline x = m + Tg \end{array}$$

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

$$\begin{array}{r} -2x \quad -2x \\ \hline 3y = -2x + 7 \\ \frac{3y}{3} = \frac{-2x + 7}{3} \\ y = \frac{-2x + 7}{3} \end{array}$$

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Notes.

An **equation** is a mathematical sentence that contains an equal sign (=).

An **algebraic equation** is an equation that contains at least one variable.

**When translating equations into mathematical equations . . .**

- Identify the key words
- Translated in the exact order they are read
- \* • Switch the order when you read: "less than", "more than", "fewer than", "subtracted from" and "taken away from" (\*\* Notice that "than" and "from" are the key words here!)
- Place parentheses around sums and differences
- Equations will contain one or more operations +, -, ·, or ÷ (use a fraction bar to translate division) **and** an equal sign.
- The word "is" usually suggests need for an equal sign.

**\*\*ALWAYS DEFINE A VARIABLE (LET STATEMENT) IF A VARIABLE IS NOT GIVEN\*\***

Write an algebraic equation to represent each of the following.

1. The difference of six times a number, x and 9 is -3.  $(6x - 9) = -3$
2. Eleven less than the quotient of y and 2 is 4.  $\frac{y}{2} - 11 = 4$
3. The product of six and a number, y, is 48. \_\_\_\_\_
4. Twelve subtracted from n is twice n. \_\_\_\_\_
5. Eight is one-half x decreased by seven. \_\_\_\_\_
- \*6. Five times the sum of m and twelve is six.  $5(m + 12) = 6$

**Define a variable, then write an algebraic equation to represent each situation.**

7. Nicholas has 28 coins in his collection. That is 5 more than his brother Sam has in his collection. Write an equation that represents the number of coins, c, that Sam has.

Let c = # of coins that Sam has

Equation:  $28 = c + 5$

Now solve your equation to find out how many coins Sam has.

8. Mr. Edwards purchased 3 bags of potatoes. He bought 36 potatoes in all. Each bag contains the same number of potatoes. Write an equation that represents this situation.

Let \_\_\_\_\_ = \_\_\_\_\_

Equation: \_\_\_\_\_

**Each bag contains the same number of potatoes. Now solve your equation to find the number of potatoes in each bag.**

### You Try!

9. Phoebe is 3 years less than half her brother's age. Phoebe is 13 years old. Her brother is  $b$  years old. Write an equation that could be used to find her brother's age.

Let \_\_\_\_\_ = \_\_\_\_\_

Equation: \_\_\_\_\_

10. Nigel went to an ice rink and paid \$5 admission plus an additional \$2.50 per hour to rent skates. The total cost was \$15. Write an equation that represents  $h$ , the number of hours for which Nigel rented skates.

Let \_\_\_\_\_ = \_\_\_\_\_

Equation: \_\_\_\_\_

### Homework - Translating Equations & Solving Two Step Equations

**Write an algebraic expression or equation to represent each of the following. Remember to read the words carefully to decide if it is an expression or an equation.**

- 1) The product of seven and  $y$  is sixteen. \_\_\_\_\_
- 2) Four times a number increased by eight \_\_\_\_\_
- 3) Sixteen less than a number,  $x$  is 3 more than  $y$ . \_\_\_\_\_
- 4) Ten decreased by  $x$  is fifteen decreased by  $n$ . \_\_\_\_\_
- 5) Fifty is twelve subtracted from  $x$ . \_\_\_\_\_
- 6) Twice the sum of  $x$  and  $y$  is three times  $z$ . \_\_\_\_\_