

1-3-19

Aim: SWBAT translate word problems into mathematical equations.

HW: Packet Pages 9 - 10

Quiz Wednesday

Do Now: Check hw

Aim: SWBAT translate phrases into mathematical expressions.

Translating When a Variable Is Assigned

- Identify the key words
- Translate into the order that the keywords require using the assigned variable
- Expressions will contain one or more operations {+, -, ·, or ÷ (use a fraction bar to translate division)}

Translate the verbal expression into a mathematical expression.

no equal sign

	A	B
1	9 <u>times</u> a number d $9d$	2 <u>less than</u> a number j $j - 2$
2	39 <u>divided by</u> a number u $\frac{39}{u}$	<u>twice</u> the <u>sum</u> of x and 3 $2(x + 3)$
3	8 <u>subtracted from</u> the <u>quotient</u> of y and 5 $\frac{y}{5} - 8$	

Translate the verbal expression into a mathematical expression. Then, simplify.

	A	B
4	The sum of $(8a + 2b - 4)$ and $(3b - 5)$. $\begin{aligned} & [(8a + 2b - 4) + (3b - 5)] \\ & 8a + 2b - 4 + 3b - 5 \\ & 8a + 5b - 9 \end{aligned}$	The sum of $-7g$ and $4g + 2$. $\begin{aligned} & [-7g + (4g + 2)] \\ & -7g + 4g + 2 \\ & -3g + 2 \end{aligned}$
5	$5m + 2$ is <u>subtracted from</u> $9m$. $\begin{aligned} & 9m - (5m + 2) \\ & 9m - 5m - 2 \\ & 4m - 2 \end{aligned}$	$-2x + 9$ is taken away from $-7x + 2$. $\begin{aligned} & (-7x + 2) - (-2x + 9) \\ & -7x + 2 + 2x - 9 \\ & -5x - 7 \end{aligned}$
6	The difference when $6h$ is subtracted from $2h - 4$. $\begin{aligned} & [(2h - 4) - 6h] \\ & 2h - 4 - 6h \\ & -4h - 4 \end{aligned}$	The difference when $-3n - 7$ is subtracted from $n + 4$. $\begin{aligned} & [(n + 4) - (-3n - 7)] \\ & n + 4 + 3n + 7 \\ & 4n + 11 \end{aligned}$

7	$13v + 2$ is subtracted from $11 + 5v$. $(11 + 5v) - (13v + 2)$ $11 + 5v - 13v - 2$ $-8v + 9$	$-18m - 4$ is added to $4m - 14$. $(4m - 14) + (-18m - 4)$ $4m - 14 - 18m - 4$ $-14m - 18$
---	---	--

Translating When a Variable Is Not Assigned

- Define a variable {state what the variable represents using let statement(s)}
- Identify the key words
- Translate into the order that the keywords require using the assigned variable
- Expressions will contain one or more operations {+, -, ·, or ÷ (use a fraction bar to translate division)}

Translate each situation into a mathematical expression.

8. The number of stamps in Ethan's collection is 4 more than half the number of the stamps in Helen's collection. Write an expression to show the number of stamps in Ethan's collection.

Let x = # of stamps in Helen's collection

$$\frac{x}{2} + 4$$

$$\frac{1}{2}x + 4$$

9. Lucy babysat for 2 hours on Friday, 3 hours on Saturday, and 2.5 hours on Sunday. She earned d dollars per hour for babysitting. Write an expression to represent the total earnings for the three babysitting jobs.

Let $2d$ = amt. for Friday

Let $3d$ = amt. for Sat.

Let $2.5d$ = amt. for Sun.

$$2d + 3d + 2.5d$$

$$7.5d$$

10. Kerrigan is k years old. Mia is twice as old as Kerrigan. William is 3 years younger than Mia. Write an algebraic expression to represent William's age.

Let $2k =$ Mia's age

Let $2k-3 =$ William's age

11. A stick is x meters long. A string is 4 times as long as the stick.

a) Express the length of the string in terms of x .

$$4x$$

b) If the total length of the string and the stick is 15 meters long, how long is the string?

$$\begin{aligned} 4x + x &= 15 \\ \cancel{4x} + \cancel{x} &= \cancel{15} \\ x &= 3 \end{aligned}$$

$$\begin{aligned} 4x & \\ 4 \cdot 3 & \\ 12 & \end{aligned}$$

The stick is 3m long and the string is 12m long.

12. Marty and Stuart are stuffing envelopes with index cards. They are putting x index cards into each envelope. When they are finished, Marty has 15 envelopes and 4 extra index cards, and Stuart has 12 envelopes and 6 extra index cards. Write an expression, in standard form, that represents the number of index cards the boys started with. Explain what your expression means.

Let $15x+4 =$ # of index cards Marty stuffed

Let $12x+6 =$ # of index cards Stuart stuffed

$$\begin{aligned} (15x+4) + (12x+6) \\ 15x+4 + 12x+6 \\ 27x+10 \end{aligned}$$

The boys started with 27 times the amt of index cards in each envelope plus 10 extra index cards.

13. A new miniature golf and arcade opened up in town. For convenient ordering, a play package is available to purchase. It includes two rounds of golf and 20 arcade tokens, plus three dollars off. There is a group of six friends each purchasing this package. Let g represent the cost of a round of golf and let t represent the cost of a token. Write two different expressions that represent the total amount this group spent. Explain how each expression describes the situation in a different way.

let $2g + 20t - 3 =$ the advertised package

$$6(2g + 20t - 3)$$

$$12g + 120t - 18$$

14. Xander goes to the movies with his family. Each member buys a ticket and two boxes of popcorn. If there are 5 members of his family, let t represent the cost of a ticket and p represent the cost of a box of popcorn. Write two different expressions that represent the total amount his family spent. Explain how each expression describes the situation in a different way.

let $t + 2p =$ family member's purchase

$$5(t + 2p)$$

$$5t + 10p$$

Aim: SWBAT translate word problems into mathematical equations.

Translating When a Variable Is Assigned

- Identify the key words
- Translate into the order that the keywords require using the assigned variable
- Equations will contain one or more operations {+, -, ·, or ÷ (use a fraction bar to translate division)} and an equal sign.

Equation - a mathematical sentence that contains an equal sign (=).

Algebraic Equation - an equation that contains at least one variable.

Write an algebraic equation to represent each of the following.

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

Translating When a Variable Is Not Assigned

- Define a variable {state what the variable represents using let statement(s)}
- Identify the key words
- Translate into the order that the keywords require using the assigned variable
- Equations will contain one or more operations {+, -, ·, or ÷ (use a fraction bar to translate division)} and an equal sign.

To "Solve Algebraically" means...

- Define a variable
- Write an algebraic equation to represent the situation
- Solve the equation
- Echo back the question in a sentence that answers the question being asked

Solve algebraically.

3. Nicholas has 28 coins in his collection. That is 5 more than his brother Sam has in his collection. How many coins does Sam have in his collection?

ARITHMETIC

$$28 - 5 = 23$$

ALGEBRAIC

Let $x = \#$ of coins Sam has _____

$$\begin{array}{r} 28 = x + 5 \\ -5 \quad -5 \\ \hline 23 = x \end{array}$$

Sam has
23 coins.

4. Mr. Edwards purchased 3 bags of potatoes. He bought 36 potatoes in all. Each bag contained the same number of potatoes. How many potatoes were in each bag?

ARITHMETIC

$$36 \div 3 = 12$$

ALGEBRAIC

Let $x = \#$ of potatoes _____

$$\begin{array}{r} 3x = 36 \\ \cancel{3} \quad 3 \\ \hline x = 12 \end{array}$$

Each bag
has 12 potatoes.

Homework

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.

	A	B
1	The product of seven and y is sixteen.	Four times a number increased by eight.
2	Sixteen less than a number, x, is 3 more than y.	Ten decreased by x is fifteen decreased by n.
3	Fifty is twelve subtracted from x.	Twice the sum of x and y is three times z.
4	Sixteen is the product of eight and y.	Twice the difference of x and three is nine.
5	The quotient of eleven and v is seven minus x.	Five times the difference of nine and x.

Solve algebraically.

6. Three times a number decreased by five is forty-nine. What is the number?

ARITHMETIC

ALGEBRAIC

Let _____ = _____

7. Mark spent \$15 at the state fair where the admission fee was \$5 and the rides cost \$2 each. How many rides did mark go on?

ARITHMETIC

ALGEBRAIC

Let _____ = _____

8. Lou has 36 rocks in his collection. He separated them into equal piles of 9 rocks. How many piles of rocks did Lou separate his collection into?

ARITHMETIC

ALGEBRAIC

Let _____ = _____