EXPRESSIONS - PAGE 1

NAME:

IN MATHEMATICS WE CAN WRITE A SENTENCE OR VERBAL PHRASE AS AN **EXPRESSION**. EXPRESSIONS ARE VERY IMPORTANT IN ALGEBRA AND HELP US CONNECT WORDS TO MATH. THERE ARE THREE TYPES OF EXPRESSIONS.

1. **VERBAL EXPRESSIONS**   2. **NUMERICAL EXPRESSIONS**   3. **ALGEBRAIC EXPRESSIONS**

A **verbal expression** contains words to explain mathematics.

A **numerical expression** contains a combination of constants (numbers) and operations such as addition, subtraction, multiplication, and division.

An **algebraic expression** contains one or more variables. It usually contains constants (numbers) and at least one operation.

Let's take a look at verbal and numerical expressions first.

Bee walks two miles a day for five days.

WE KNOW HOW MANY MILES AND DAYS SHE WALKS. THE AMOUNTS NEVER CHANGE AND WE CALL THESE **CONSTANTS**, BECAUSE THEY CONSTANTLY STAY THE SAME, NO MATTER WHAT HAPPENS.

We can write the sentence above as a verbal expression and a numerical expression.

verbal expression $\longrightarrow$ two times five

numerical expression $\longrightarrow$ 2 x 5

THE TWO MILES AND 5 DAYS ARE CONSTANTS.

The table below shows some common words and phrases and their related operations.

+	**-**	**✖**	**÷**
plus	minus	times	divide
the sum of	the difference of	multiplied by	the quotient of
increased by	decreased by	the product of	divided by
more than	less than	groups of	among

Write a numerical expression for each verbal expression.

a. the quotient of 6 and 2 $6 \div 2$ **or** $\dfrac{6}{2}$

1. the sum of 10 and 3

2. 7 more than 9

3. the product of 8 and 5

4. 4 less than 11

MORE THAN AND **LESS THAN** ARE WRITTEN BACKWARDS.

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Write a verbal expression for each numerical expression.

a. $5 + 8$ **the sum of 5 and 8**

1. $\dfrac{7}{3}$ _____

2. $9 - 2$ _____

3. 5×3 _____

4. $12 \div 6$ _____

Now let's take a look at algebraic expressions.
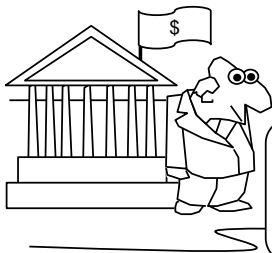
Stew works at the bank and gets paid $130.00 everyday he works.

WE KNOW HOW MUCH HE GETS PAID. IT NEVER CHANGES AND IF YOU FORGOT, WE CALL THIS A **CONSTANT**. BUT HOW MANY DAYS DOES HE WORK? IN MATH, WE CALL THIS A **VARIABLE** BECAUSE IT CAN CHANGE. USUALLY WE USE LETTERS TO REPRESENT AN UNKNOWN AMOUNT.

We can write the sentence above as an algebraic expression and a verbal expression.

algebraic expression $\longrightarrow$ $130.00 \times d$

verbal expression $\longrightarrow$ the product of $130.00 and d

THE $130.00 IS THE CONSTANT AND "d" IS THE VARIABLE. "d" REPRESENTS THE NUMBER OF DAYS I WORK.

Below are a couple examples of algebraic expressions.

$y - 5$

y is the variable and 5 is the constant.

$4z$

$4z$ means 4 x z.

$\dfrac{t}{8}$

$\dfrac{t}{8}$ means t ÷ 8.

Write an algebraic expression for each verbal expression.

b. the difference of 8 and a number   **8 - *n***

5. a number divided by 7 _____

6. 4 more than 2 times a number _____

7. the quotient of 12 and a number _____

8. the sum of 5 times a number and 6 _____

Write an algebraic expression for the phrase below.

9. eight more girls in a classroom _____

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NAME:

WHEN YOU STUDY ALGEBRA YOU WILL NOTICE THAT "X" IS NOT USUALLY USED FOR MULTIPLICATION. IT LOOKS LIKE A LETTER AND GETS CONFUSING, SO WE USE A DOT, PARENTHESES, OR JUST PUT THE NUMBERS AND VARIABLES (LETTERS) TOGETHER.

Below are a couple examples of multiplication.

2 **x** 3 is the same as 2 • 3 and 2(3)

5 **x** y is the same as 5 • y and 5y
This looks like 5xy not 5 times y.

Write a verbal expression for each algebraic expression.

a. $9(2 + d)$ **9 times the sum of 2 and *d***

1. $6 + w$

2. $4v + 3$

3. $\dfrac{k}{8}$

4. $m - 7$

5. $5 \div y$

DON'T FORGET PARENTHESES, BRACKETS, AND BRACES ARE GROUPING SYMBOLS THAT TELL US TO DO THE OPERATION OR OPERATIONS THAT ARE INSIDE THE SYMBOLS FIRST. THIS GETS A LITTLE CONFUSING WHEN WRITING EXPRESSIONS. CHECK OUT HOW THE EXPRESSIONS BELOW CHANGE WHEN GROUPING SYMBOLS ARE INCLUDED.

VERBAL EXPRESSION	*ALGEBRAIC EXPRESSION*
4 plus the product of 9 and a number	$4 + 9a$
the product of 4 plus 9 and a number	$(4 + 9) \bullet a$
the sum of 8 subtracted by a number and 5	$8 - n + 5$
8 subtracted by the sum of 5 and a number	$8 - [n + 5]$
the difference of 3 and a number divided by 9	$3 - d \div 9$
the difference of 3 and a number, divided by 9	$\{3 - d\} \div 9$

Now your turn. Write an algebraic expression for each verbal expression.
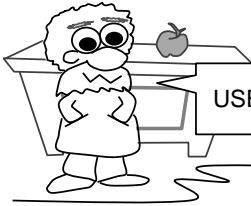
6. the quotient of 6 plus a number and 4

7. 7 decreased by the sum of 3 and a number

8. 9 plus the quotient of a number and 5

9. the sum of 2 and a number, multiplied by 8

EXPRESSIONS - REVIEW

NAME:

USE WHAT YOU'VE LEARNED TO ANSWER THE QUESTIONS BELOW.

Write a numerical or algebraic expression for each verbal expression.

1. 9 decreased by 4

2. five times a number

3. the sum of 7 and a number, divided by 2

4. 14 less than 3

5. the product of 6 and b

6. 8 more than 4 times a number

7. the quotient of 22 and 4

8. 5 times the difference of a number and 7

Write a verbal expression for each algebraic or numerical expression.

9. $7b$

10. $4 + \dfrac{k}{8}$

11. $6 + 10$

12. $(2 + n) \bullet 5$

13. $\dfrac{t}{6}$

14. $5 - 12$

15. $(e + 9) \div 3$

16. $2(k + 8)$

Write an algebraic expression for each phrase.

17. a number of pencils less than 15

18. a car travels 60 miles per hour

19. a bag of apples shared equally among 6 people

20. 9 centimeters taller than Kern

Challenge yourself. Write an algebraic expression for this sentence.

21. A container has 50 gallons of water and is being filled at a rate of 4 gallons per minute.