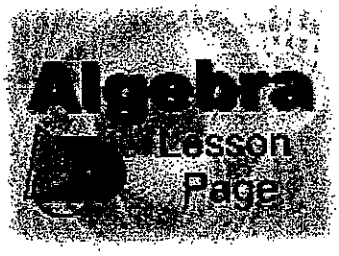

Algebraic Representation

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Solving problems in algebra depends on your ability to represent missing unknown quantities.

Representing unknown quantities is easy to do if you know the "language".

For example, what operation is meant by the phrase more than ?

If you guessed addition, then you are right! This skill of "translating" between words and mathematical operations just takes a little vocabulary drill. Below a some of the most common phrases used in problem solving, together with the operations they represent. Study these relationships and you should be a whiz a algebraic representation.

ADD	SUBTRACT	MULTIPLY	DIVIDE
add	subtract	multiplied by	divide
sum	difference	of	quotient
more than	*less than	product	divided equally
increased by	decreased by	times	per
exceeds	diminished by	double	ratio of
in all	minus	twice	
total	fewer	triple	
gain	reduced by		
plus			

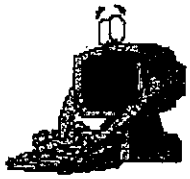
* be careful using **"less than"** - it reverses the order of things
Also, be careful of the placement of commas in statements.
In the statement "*the sum of a and b, divided by 3*" the comma indicates that the answer is $(a+b)/3$ and not $a + b/3$.

Examples

1.	two more than a number	$2 + x$
2.	five less than three times a number	$3x - 5$ notice how this changed the order
3.	seven times a number, increased by 4	$7x + 4$
4.	six decreased by 5 times a number	$6 - 5x$

Now let's try working in the other direction:

5.	Given $2x - 4$, write a verbal expression that matches this mathematical expression.	Some possible verbal answers: twice a number decreased by 4 four less than two times a value double a number minus 4 two times a number diminished by 4



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Created by Michael Murray

Words and Phrases to Math Symbols

Addition

Plus
And
Total of
Altogether Increased By
Combined Add Sum
Together More Than
Added To
In All
Make

Subtraction

Subtract Gave Take Away
Decrease By Fewer Minus
Shared Fewer Than Less Than
Difference Less

Multiplication

Times Triple
Double Product
Multiplied By
OF
Increased By a Factor
Twice Multiple

Division

Quotient of Per Ratio of
Divided By Half Divisor
Divided Into Percent Split Up

Equals

Is Are Were Was

Will Be Yields Sold For

Parenthesis Words

The Quantity of
Twice the sum of
Times the sum of
Times the difference of
Plus the difference of

Name_____

Variable and Verbal Expressions

Date_____ Period____

Write each as an algebraic expression.

1) the difference of 10 and 5

2) the quotient of 14 and 7

3) u decreased by 17

4) half of 14

5) x increased by 6

6) the product of x and 7

7) the sum of q and 8

8) 6 squared

9) twice q

10) the product of 8 and 12

11) the quotient of 18 and n

12) n cubed

Write each as a verbal expression.

13) $\frac{x}{2}$

14) $a + 9$

15) $19 - 3$

16) $5n$

17) q^2

18) $\frac{40}{5}$

19) $\frac{a}{8}$

20) $x + 8$

21) $n - 14$

22) 2^2

23) $\frac{60}{5}$

24) $n \cdot 6$

Evaluate each expression.

25) 5 squared

26) the product of 8 and 10

27) 20 decreased by 17

28) the quotient of 96 and 8

29) twice 6

30) 10 less than 17

31) 9 times 5

32) 10 increased by 8

33) 7 squared

34) the product of 4 and 5

TRANSLATING ENGLISH PHRASES INTO ALGEBRAIC LANGUAGE

Translate each phrase into symbols:

A.	1.	The sum of x and 4	1. _____
	2.	The product of a and b	2. _____
	3.	Increase y by 10	3. _____
	4.	The difference between x and y	4. _____
	5.	k diminished by 12	5. _____
	6.	Twice n	6. _____
	7.	4 more than r	7. _____
	8.	y divided by x	8. _____
	9.	14 less n	9. _____
	10.	The sum of 2x and y	10. _____
	11.	r squared	11. _____
	12.	4 less than z	12. _____
	13.	The product of n and m	13. _____
	14.	One-fourth of n	14. _____
	15.	3 more than twice n	15. _____
	16.	5 less than 5 times x	16. _____
	17.	6 times x increased by 3	17. _____
	18.	t more than w	18. _____
B.	19.	8 more than the product of three times a number	19. _____
	20.	The sum of a squared and b squared	20. _____
	21.	Twice the sum of x and y	21. _____
	22.	Three-fourths of a increased by 6	22. _____
	23.	One-half the sum of L and W	23. _____
	24.	A number that exceeds n by 4	24. _____
	25.	The square of the sum of a and b	25. _____

Name_____

Math A

Translate the following phrases into algebraic terms.

1) 5 more than 2 times a number	
2) 7 less than 3 times a number	
3) 4 times a number decreased by two	
4) twice a number diminished by 9	
5) 6 less than a number	
6) 8 increased by 8 times a number	
7) the sum of a number and 6	
8) 4 times a number, decreased by 3	
9) 3 times the sum of twice a number and 8	
10) two-thirds of a number	
11) 4 times a number, increased by 3 times the number	
12) 2 times a number increased by 8	
13) the quotient of a number and 12	
14) half of 3 times a number	
15) 5 times a number diminished by 6	
16) 4 times the difference between twice a number and 8	
17) one fourth of a number	
18) the product of 6 and number	
19) 14 reduced by 3 times a number	
20) a number divided by 3	

Names Homework Date 9/27/18

Directions: Use mathematical symbols to translate each written expression.

1. 8 plus 8 _____
2. 7 minus 3 _____
3. y plus 3 _____
4. product of 6 and d _____
5. 5 less than 8 _____
6. 15 added to b _____
7. one-third of 4 _____
8. 20 divided by 4 _____
9. 20 decreased by w _____
10. r multiplied by 6 _____
11. 20 times 4 _____
12. twice w _____
13. the sum of b and 8 _____
14. a number that exceeds m by 4 _____

Name : _____ Score : _____

Teacher : _____ Date : _____

Translate Algebraic Expressions

1) Take away 4 from 8 times p _____

2) One-half of w is subtracted from 3 _____

3) Three-fifths of n is added to 4 _____

4) 2 minus b _____

5) Two-fifths of the sum of 9 and q _____

6) 8 is added to five-sixths of m _____

7) One-fourth of the sum of x and 4 _____

8) Sum of s and 7 _____

9) y is added to 9 _____

10) 5 less than d _____

Why Did the Cow Keep Jumping Over the Barrel?

Translate each phrase below into an algebraic expression and find your answer in the corresponding answer column. Write the letter of that exercise in the box that contains the number of the answer.

(E)	3 times a number	(18)	$x + 3$
(O)	3 more than a number	(15)	$3x - 8$
(S)	3 decreased by a number	(19)	$x - 3$
(R)	3 less than a number	(12)	$3x + 8$
(A)	one third of a number	(3)	$3x$
(I)	8 more than 3 times a number	(25)	$3 - x$
(N)	8 less than 3 times a number	(5)	$\frac{x}{3}$
(S)	5 times a number, increased by 8	(22)	$8(x + 5)$
(A)	5 times the sum of a number and 8	(4)	$8(2x + 5)$
(H)	5 more than 8 times a number	(2)	$8x + 5$
(O)	8 times the sum of a number and 5	(13)	$2(5x + 8)$
(C)	twice the sum of 5 times a number and 8	(6)	$5x + 8$
(T)	2 more than five eighths of a number	(20)	$5(x + 8)$
(W)	8 times the sum of twice a number and 5	(11)	$\frac{5}{8}x + 2$
(A)	7 less than 4 times a number	(1)	$7 - 4x$
(S)	7 decreased by 4 times a number	(16)	$2x - 9$
(G)	9 less than twice a number	(14)	$7x + 4$
(N)	9 decreased by twice a number	(9)	$4x - 7$
(O)	9 less than half a number	(8)	$7x + 4x$
(I)	7 times a number, increased by 4	(24)	$9 - 2x$
(R)	7 times a number, increased by 4 times the number	(27)	$\frac{x}{2} - 9$
(T)	9 meters higher than altitude x	(7)	$x + 15$
(F)	15 meters per second slower than speed x	(28)	$x + 9$
(P)	15°C hotter than temperature x	(26)	$4x - 9$
(O)	9 meters shorter than twice length x	(23)	$2x - 9$
(C)	9 years older than twice age x	(10)	$2x + 9$
(H)	\$9 cheaper than 4 times price x	(17)	$x - 15$
(M)	9 centimeters less than three fourths of length x	(21)	$\frac{3}{4}x - 9$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28

OBJECTIVE 1–j: To translate English phrases into algebraic expressions.

Problem Solving

The sum of three times a number and 45 is 67. Find the number.

$3x + 45 = 66$
$3x + 45 - 45 = 66 - 45$
$3x = 21$
$x = 7$ The number is 7.

Write an equation for each word problem and solve it.

1. The sum of 5 times a number and -11 is -16. Find the number.
   Equation_____
   Solution_____
2. The sum of four times a number and 3 is -13. Find the number.
   Equation_____
   Solution_____
3. 5 times the sum of a number and 2 is 35. Find the number.
   Equation_____
   Solution_____
4. 3 times the sum of a number and negative 2 is -15. Find the number.
   Equation_____
   Solution_____
5. Six times the difference of a number and 9 is 42. Find the number.
   Equation_____
   Solution_____
6. The sum of eight times a number and 3 is 59. Find the number.
   Equation_____
   Solution_____
7. Twelve times the sum of a number and -8 is 36. Find the number.
   Equation_____
   Solution_____
8. The sum of seven times a number and 11 is 81. find the number.
   Equation_____
   Solution_____