

GSE Algebra

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Unit 1 – Relationships Among Quantities

Notes

Name: _____ Date: _____

Interpret Language in Math Expressions

Definitions:

Vocabulary	Definition	Examples
Algebraic Expression	math express. containing #s, letters or combo (+/-)	$5x+2$
Variable	letter	n
Term	Separated by +/- #, letters	$5x^2$
Like Terms	terms you can combine (same variable w/ same exponent)	$5x+3x$
Coefficient	# in <u>FRONT</u> of letter	$5x$
Exponent	power raised	$5x^2$
Base	# that is multiplied when using an exponent	x^2 5^2
Constant	# w/o variable (plain #)	
Order of Operations	PE(MD)AS () x u v d u p o t a d u n t e r a d u .	

$$4 \div 2 \cdot 6$$

$$2 \cdot 6 = 12$$

Translating Expressions

Addition	Subtraction	Multiplication	Division	Exponents
Sum	Difference	Of	Quotient	Power
Increased by	Decreased by	Product	Ratio of	Squared
More than	Minus	Times	Each	Cubed
Combined	Less	Multiplied by	Fraction of	
Together	Less than	Double, Triple	Out of	
Total of	Fewer than	Twice	Per	
Added to	How many more	As much	Divided by	
Gained	Left	Each	Split	
Raised	Use Parenthesis: The quantity of			
Plus				

Practice: Write the expression for each verbal description:

1. the difference of 10 and 5

$$10 - 5 = 5$$

2. The quotient of 14 and 7

$$14 \div 7 = 2$$

3. y decreased by 17

$$y - 17$$

4. x increased by 6

5. The sum of q and 8

6. 6 squared

$$6^2$$

7. twice q

8. 4 times 5 plus 7

$$(4 \times 5) + 7$$

$$20 + 7 = 27$$

P
E
M
D
A
S

9. The product of 9 and x squared

$$9x^2$$

10. 9 more than twice k

$$9 + 2k$$

11. The sum of a number and 10

12. 9 less than g to the fourth

$$g - 9$$

13. 2 minus the quantity 3 more than p

$$2 - (3 + p)$$

14. Half of the quantity 1 more than w

$$\frac{1}{2}(1 + w) = \frac{(1 + w) - 6}{2}$$

$$2 - (3 + 5) = 2 - 3 + 5$$

$$2 - 8 = -1 + 5$$

$$-6 = 4$$

15. Five times a number increased by 5 is the same as 3 times the same number decreased by 7.

$$5x + 5 = 3x - 7$$

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16. Four times a number plus 10 minus two times the same number is 6.

Practice: Write each as a verbal expression.

1. $\frac{x}{2}$ 2. $3a + 9$ 3. $19 - 3$ 4. $5n$
- a number divided by 2
half of a number
quotient of x and 2
- 3 times "a" plus 9
3 multiplied by a number added to 9

Algebraic Expressions

An expression containing variables (letters), numbers, and operation symbols is called an

algebraic expression.

vary

In an algebraic expression, there are four different parts: coefficients, variables, constants, and terms.
For example:

$$\underbrace{5x}_1 + \underbrace{7y}_2 - \underbrace{3}_3$$

Variables are the letters in an expression.

x, y

Coefficients are the numbers in front of the variables.

$5, 7$

Constants are the "plain numbers."

-3

Terms are separated by a + or - sign and can be numbers and/or variables

$5x, 7y, -3$

Complete the table below.

Expression	How Many Terms?	List Variables	List Constants	List Coefficients
$2x + 5$	2	x	5	2
13	1	—	13	—
$6m - 9n + 5 - 4$	4	m, n, s	-4	6, -9, 1
$x^2 + 7x - 1$	3	x	-1	7, 1

in front

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Practice. Combine Like terms. Then identify the number of terms.

1. $-3p + 6p$

$3p$

2. $b - 3 + 6 - 2b$

3. $8m + 1n - 3 + 10$

$8m + 1n + 7$

4. $9x - 10x^2 + 7x - 3$

$16x - 10x^2 - 3$

5. $-6k + 7k$

6. $n - 10 + 9n - 3$

$10n - 13$

Classifying Algebraic Expressions/Polynomials

Algebraic Expressions are typically written in standard form, which means the terms are arranged in decreasing order from the largest exponent to the smallest exponent. The degree is the largest exponent of the variable in the expression.

* ducks in a row * = 

Rewrite each algebraic expression in standard form. Then identify the degree of the expression:

a. $5x - 6x^2 - 4$

$-6x^2 + 5x - 4$

Standard Form:

$-6x^2 + 5x - 4$

Degree: 2

b. $-7x + 8x^2 - 7 - 8x^2$

$8x^2 - 8x^2 - 7x - 7$

Standard Form:

$-7x - 7$

Degree: 1

c. $6(x - 1) - 4(3x^2) - x^2$

$6x - 6 - 12x^2 - x^2$

Standard Form:

$-13x^2 + 6x - 6$

Degree: 2

Algebraic Expressions are classified by **DEGREE** and **NUMBER OF TERMS**:

"FIRST NAME"

degree = largest exponent

"LAST NAME"

of terms = components separated by +/−

exponent does not matter

$25x^0 = 25$

✓

Degree	Name	Example
0	constant	$1 = 1x^0$
1	linear	$69x = 69x^1$
2	quadratic	$4a^2$
3	cubic	$6x^3$

# of Terms	Name	Example
1	monomial	$5x$
2	binomial	$5x + 7$
3	trinomial	$3x^2 + 5x + 8$
4+	polynomial	$10x^5 + 2x^3 + 5x + 1$

Algebraic Expression	Degree	# of Terms	Classification
$8x$	1	1	linear monomial
$x^2 - 4$	2	2	quadratic binomial
10	0	1	constant monomial
$x^2 + 3x - 24$	2	3	quadratic trinomial
$5x^3 - 12 + 8$	3	2	cubic binomial
$7x - 9x + 1$	1	2	linear binomial
$4x^3 - 5x^2 + 4 + 5x - 1$	3	4	cubic polynomial
$2x + 3 - 7x^2 + 4x + 7x^2$	1	2	linear binomial