

Warm Up - October 1st

Answer the following questions on your board.

1) What was the best part of your break?

2) What is one thing you are excited for this week?

3) How do you study for math quizzes/tests?

Day 1 – Algebraic Expressions

An expression containing variables (letters), numbers, and operation symbols is called an **algebraic expression**. An example of an algebraic expression is $5x + 7y - 3$.

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

$$5x + 7y - 3$$

Variables:

letters that represent the unknown

x, y

Coefficients:

numbers in front of the variables

$5, 7$

Constants:

numbers without variables

-3

Terms:

pieces that are being added or subtracted

$5x, 7y, -3$

Complete the table below.

Expression	How Many Terms?	List Variables	List Constants	List Coefficients
$2x + 5z - 3$	3	x, z	-3	$2, 5$
13	1	none	13	none
$6m^3 - 9m^2 + s - 4$	4	m, s	-4	$6, -9, 1$
$x^2 + 7x - 1$	3	x	-1	$1, 7$

*** same variable with the same exponent ***

Combining Like Terms

1. $-3p + 6p$
 $\downarrow \quad \downarrow$
 $3p$

2. $b - 3 + 6 - 2b$
 $\underline{\quad} \underline{\quad} \underline{\quad} \underline{\quad}$
 $-1b + 3$

3. $8m + 1n - 3 + 10$
 $\underline{\quad} \underline{\quad} \underline{\quad} \underline{\quad}$
 $8m + 1n + 7$
 or $8m + n + 7$

4. $9x - 10x^2 + 7x - 3$
 $\underline{\quad} \underline{\quad} \underline{\quad} \underline{\quad}$
 $10x^2 - 10x^2 - 3x^0$
 $\downarrow \quad \downarrow$
 $-10x^2 + 16x - 3$

5. $4x - 5(x - 1)$
 $\downarrow \quad \downarrow$
 $4x - 5x + 5$
 $-1x + 5$
 or
 $-x + 5$

6. $2(3 + x) + 4(1 - 8x) + 5$
 $\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$
 $6 + 2x + 4 - 32x + 5$
 $-30x + 15$

Writing Expressions in Words

Addition	Subtraction	Multiplication	Division
Sum	Difference	Of	Quotient
Increased by	Decreased by	Product	Ratio of
More than	Minus	Times	Percent
Combined	Less	Multiplied by	Fraction of
Together	Less than	Double (x2)	Out of
Total of	Fewer than	Twice (x2)	Per
Added to		Triple (x3)	Divided by
Gained			Half (÷2)
Raised	Use Parenthesis: The quantity of		
Plus			

Practice: Write the expression for each verbal description:

1. The difference of 10 and 5
 ↪ subtracting
 $10 - 5$

2. The quotient of 14 and 7
 ↪ division
 $\frac{14}{7}$ or $14 \div 7$

3. y decreased by 17
 ↪ sub.
 $y - 17$

4. x increased by 6
 ↪ add
 $x + 6$

5. The sum of q and 8
 ↪ add
 $q + 8$

6. 6 squared ↪ exponent of 2
 6^2

7. Twice q
 $2q$
mult. by 2

8. 4 times 5 plus 7
 $4 \cdot 5 + 7$
mult. add

9. 8 more than twice k
 $8 + 2k$ or $2k + 8$
add mult. by 2

10. 2 minus the quantity 3 more than p
 $2 - (3 + p)$
sub. parenthesis add

11. Half of the quantity 1 less than w
 $(w - 1) \div 2$
div. by 2 parenthesis subtract taking 1 away

or $2 - (p + 3)$

Practice: Write each as a verbal expression.

1. $\frac{x}{2}$ x divided by 2 *half of x* $\frac{(x-1)}{2}$ or

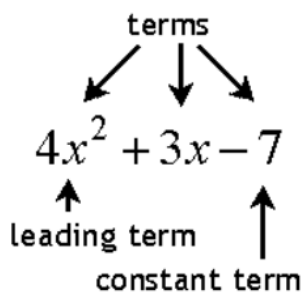
2. $a + 9$ the sum of a and 9

3. $5n - 7$ 7 less than 5 times n | 5 times n decreased by 7

4. $3(y + 7)$ 3 times the quantity y plus 7

Classifying Polynomials

A **POLYNOMIAL** is a mathematical expression consisting of terms, which can include a constant, variable, or product of a constant and variable, that are connected together using addition or subtraction. Variables must have exponents raised to whole number exponents.



Number of Terms: 3

Terms: $4x^2, 3x, -7$

Coefficient(s): 4, 3

Constant(s): -7

Polynomials CANNOT contain:

- Radicals (✓)
- Fractional exponents
- Negative exponents
- No variables in the denominator

Cross off all expressions that are NOT polynomials:

Polynomials are typically written in **STANDARD FORM**, which means the terms are arranged in decreasing order from the largest exponent to the smallest exponent. When you write polynomials in standard form, you can easily identify the degree of the polynomial. The DEGREE is the largest exponent of the variable in the polynomial.

Rewrite each polynomial in standard form. Then identify the degree of the polynomial.
 (Hint: begin with simplifying and combining like terms before putting in standard form)

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

no like terms

Standard Form:

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

Degree:

2

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

$-7x + 0x^2 - 2$



Standard Form:

$-7x - 2$

Degree:

1

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

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

$6x - 6 - 13x^2$



Standard Form:

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

Degree:

2

always write your answers in standard form

* when classifying, the first word will come from degree + the second word will

Classifying Polynomials

Come from the

Polynomials are classified by DEGREE and NUMBER OF TERMS: # of terms *

degree = the largest exponent

terms = pieces that are being added and/or subtracted

Degree	Name	Example	Terms	Name	Example
0	constant	$5x^0$	1	monomial	$3x^2$
1	linear	$-2x^1$	2	binomial	$4x^3 - 2$
2	quadratic	$3x^2 + 4x$	3	trinomial	$6x^2 - 9x + 1$
3	cubic	$6x^3 - 9$	4 or more	polynomial	$x^3 - 2x^2 + 3x - 6$

Complete the table below. Simplify the expressions or put in standard form if necessary.

Polynomial	Degree	# of Terms	Classification
$8x^1$ ✓	1	1	linear monomial
$x^2 - 4$ ✓	2	2	quadratic binomial
10 ✓ $10x^0$	0	1	constant monomial
$-24 + 3x - x^2$ $-x^2 + 3x - 24$	2	3	quadratic trinomial
$5x^3 - 12 + 8$ $5x^3 - 4$	3	2	cubic binomial
$7x - 9x + 1$ $-2x + 1$	1	2	linear binomial
$4x^2 - 5x^3 - 4 + 5x - 1$ $-5x^3 + 4x^2 + 5x - 5$	3	4	cubic polynomial
$2x + 3 - 7x^2 + 4x + 7x^2$ $6x + 0x^2 + 3$ $6x + 3$	1	2	linear binomial

$$4x - 10x^2 + 7x - x^2 + 4 - 12$$

① simplify $11x - 11x^2 - 8$

② put in standard form
 $-11x^2 + 11x - 8$

③ classify quadratic trinomial