

Good morning!

1. "Here"
2. Welcome to Spring 2021
3. Notes on Parts of an Expression
4. Practice to be uploaded to CTLS
5. Homework on DeltaMath (286813)

| January | | | | |
|--|---|---|---|--|
| 4 Teacher Workday | 5 Teacher Workday | 6 Read over Syllabus and Familiarize yourself with CTLS Class | 7 Parts of an Expressions Operations w/ Poly | 8 Operations w/ Poly |
| 11 One/Two Step Equations Multistep Equations | 12 Multistep Equations and Inequalities | 13 Independent Workday QUIZ | 14 Literal Equations | 15 Word Problems |
| 18 No School | 19 Word Problems Review | 20 Independent Workday TEST | 21 Graphing Slope Intercept Form Graphing in Standard Form | 22 Characteristics |
| 25 Function Notation | 26 Arithmetic Sequences | 27 Independent Workday | 28 Arithmetic Sequences Review QUIZ | 29 Systems Graphing |
| February | | | | |
| 1 Substitution | 2 Elimination | 3 Independent Workday QUIZ | 4 Word Problems | 5 Word Problems Graphing Inequalities |
| 8 Graphing Systems Inequalities | 9 Review | 10 Independent Workday TEST | 11 GCF Grouping | 12 Factoring |

Expressions

You are familiar with the following type of **numerical expressions**:

$$12 + 6$$

$$3 (12)$$

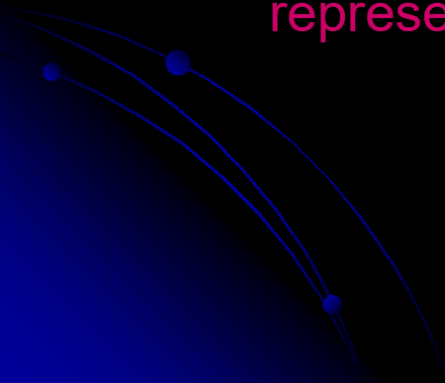
$$6 (3 + 2)$$

$$15 - 4 (6)$$

What is a variable?

In the expression $12 + B$, the letter "B" is a variable.

A **variable** is a letter or symbol that represents an unknown value.



Algebraic Expressions

When variables are used with other numbers, parentheses, or operations, they create an **algebraic expression**.

$$a + 2$$

$$(a)(b)$$

$$3m + 6n - 6$$

What are coefficients?

A **coefficient** is the number multiplied by the variable in an algebraic expression.

| <u>Algebraic Expression</u> | <u>Coefficient</u> |
|-----------------------------|--------------------|
| $6m + 5$ | 6 |
| $8r + 7m + 4$ | 8, 7 |
| $14b - 8$ | 14 |

What is a term?

A **term** is the name given to a number, a variable, or a number and a variable combined by multiplication or division.

Terms are separated by + or - .

Algebraic Expressions

$$a + 2$$

$$3m + 6n - 6$$

Terms

$$a, 2$$

$\checkmark \uparrow \#$

$$3m, 6n, -6$$

$\checkmark \uparrow$
 $\# \checkmark$

What are constants?

- A constant is a number that cannot change its value.

In the expression: $5x + 7y - 2$
the constant is $- 2$.

Figure it out!

Identify the terms, coefficients, and constants.

1. $\underbrace{12a} - \underbrace{6b} + \underbrace{4}$

2. $4x - 2y$

3. $1c - 32$

4. $3x + 2$

terms: $12a,$
 $-6b,$
 4

coeff: $12, -6$

constant: 4

Writing Algebraic Expressions

- You can translate word phrases into variable expressions.
 - Examples:
 1. Three more than a number = $x + 3$
 2. The quotient of a number and 8 = $y/8$
 3. Six times a number = $6 \times n$ or $6n$
 4. 15 less than a number = $z - 15$
 5. The quotient of 30 and a number plus 10 = $30/x + 10$.

Key words to look for:

- Addition:

- Add
- Plus
- Sum
- Total
- Increased by
- More than

- Subtraction:

- Minus
- Difference
- Subtract
- Less than
- Decreased by
- less

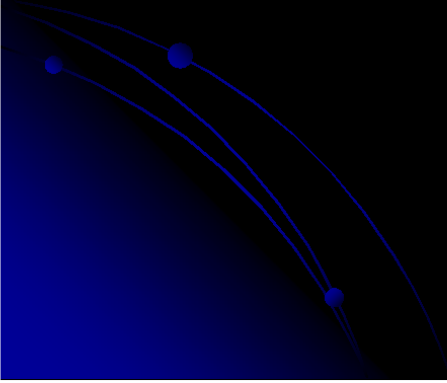
Cont...

- Multiplication

- Product
- Times
- multiply

- Division

- Quotient
- divide



Write algebraic expressions for these word phrases

1. Four more than s
2. The product of 7 and c
3. Nine less than x
4. A number divided by the sum of 4 and 7.
5. Twice the sum of a number plus 4.
6. The sum of $\frac{3}{4}$ of a number and 7.
7. Ten times a number increased by 150.

Write an algebraic phrase for these situations

1. A car was traveling 35 miles per hour for a number of hours.
2. Bob ran 7 times a week for a number of weeks.
3. The plumber added an extra \$35 to her bill.
4. Thirty-five fewer people came than the number expected.

DEFINITION



- **Polynomials** : means more than one term.

Examples of Polynomials: * **Terms are separated by a + or - sign.**

1 term $12x^3y$ → Monomial
3 terms $8x^2 + 4x - 3$ → Trinomial
2 terms $x^2 - 9$ → Binomial

CLASSIFYING POLYNOMIAL

Monomial: **Mon** means one, a polynomial with one term.

Examples of Monomials: *Terms are joined by a multiplication.

○ 2

○ $-4x$

○ $100x^2$

○ $6x^3y^2$

$$\frac{1}{2}x^2$$



CLASSIFYING POLYNOMIAL

* **Terms are separated by a + or - sign.**

○ **Binomial:** Bi means two, a polynomial with two terms.

○ **Examples of Binomials:**

○ $x^2 + 4$

○ $-4x^3 - 8$

○ $10x^2 + 1$

○ $6x^3y^2 - 12$



CLASSIFYING POLYNOMIAL

Terms are separated by a + or - sign.

Trinomial: Tri means three, a polynomial with three terms.

Examples of Trinomials:


- $\underbrace{4x^2} + \underbrace{2x} + \underbrace{4}$
- $\underbrace{-4x^3} - \underbrace{8x^2} + \underbrace{2}$
- $\underbrace{10x^2} - \underbrace{x} + \underbrace{1}$





CLASSIFYING POLYNOMIAL

- * More than 3 terms is called a polynomial
- Polynomials are named by the highest degree of the expression.
 - When written in Standard Form (from largest to smallest exponent) largest degree term in the polynomial should be leading term.

$$x^7 + x^6 + x^5 + x^4 + x^3 + x^2 + x^1 + 2$$




CLASSIFYING POLYNOMIAL

Name of Polynomial by degree:

$$4x^{\circ} = 4(1) = 4 \quad \text{Constant}$$

$$-4x^{\textcircled{1}} - 8 \quad \text{Linear}$$

$$x^{\textcircled{2}} + 2x' - 3 \quad \text{Quadratic}$$

$$3x^{\textcircled{3}} - 5x' \quad \text{Cubic}$$

The degree of a polynomial is the highest exponent on a term of the polynomial.

largest exponent → constant

The standard form of a polynomial that contains one variable is written with the terms in order from greatest degree to least degree. When written in standard form, the coefficient of the first term is called the leading coefficient.

Expressions/Polynomials – Parts, Standard Form, Classifying

Terms: _____

Variables: _____

Coefficients: _____

Constants: _____

Like Terms: _____

Degree: _____

Examples:

1) $6x - 2y + x - 5$

2) $2c + b + 8a - 1$

Terms: _____

Terms: _____

Like Terms: _____

Like Terms: _____

Variables: _____

Variables: _____

Coefficients: _____

Coefficients: _____

Constants: _____

Constants: _____

★ Standard Form of a Polynomial: _____

★

Classifying Polynomials (Naming Polynomials)

| By Degree | | By Number of Terms | |
|-----------|------|--------------------|------|
| Degree | Name | # of Terms | Name |
| 0 | | 1 | |
| 1 | | 2 | |
| 2 | | 3 | |
| 3 | | 4 or more | |
| 4 | | | |
| 5 | | | |
| 6 + | | | |

Examples:

1) $6x - 2y + x - 5$

Terms: $6x, -2y, x, -5$ Like Terms: $6x, x$ $6x+x=7x$ Variables: x, y Coefficients: $6, -2, 1$ Constants: -5 Like terms \rightarrow terms with SAME Variable raised to SAME Power

2) $2c + b + 8a - 1$

Terms: $2c, b, 8a, -1$ Like Terms: noneVariables: c, b, a Coefficients: $2, 1, 8$ Constants: -1

Classifying Polynomials (Naming Polynomials)

| By Degree | | By Number of Terms | |
|-----------|--|--------------------|------------|
| Degree | Name | # of Terms | Name |
| x^0 | Constant | 1 | Monomial |
| x^1 | Linear | 2 | Binomial |
| x^2 | Quadratic | 3 | Trinomial |
| x^3 | Cubic | 4 or more | Polynomial |
| x^4 | Quartic | | |
| x^5 | Quintic | | |
| $6+$ | 6 th Degree, 7 th Degree, ... n th degree | | |

Identifying Parts of Algebraic Expressions Practice

| 1) How many terms are in each of the following algebraic expressions? | Answers: |
|---|---------------|
| a) $6x^3 + 8x^2 - 4x$ | 3, trinomial |
| b) $15xy^3 + 21x^2 - 16$ | 3, trinomial |
| c) $19x^4 + 8x^2 + 4xy - 2$ | 4, polynomial |
| d) $8x^3 + 14x^5 - 20x^2 + 9x - 25$ | 5, polynomial |
| e) $9x^3y + 5x^4 - 24x^2 + 7x - 6x^6$ | 5, polynomial |
| f) $2ab + 7$ | 2, binomial |
| g) $15xy + 7x + 2y + 9$ | 4, polynomial |

| 2) Identify the coefficients, constants, and variables in each expression. | Coefficients | Constants | Variables |
|--|--------------|-----------|-----------|
| a) $81x^3 + 7xy^2 - 14x$ | 81, 7, -14 | none | x, y |
| b) $4x^3 + 8x^2 - 24$ | 4, 8 | -24 | x |
| c) $61x^2 + 6x + 7$ | | | |
| d) $4xyz^3 + 8x^2 - 2xy^2 + 29x - 46$ | 4, 8, -2, 29 | -46 | x, y, z |
| e) $22a^3 + 38a^2 - 12b$ | | | |
| f) $28a^2 - 17ab$ | | | |
| g) $7x + 2xy$ | | | |

on the variable

| 3) Identify the exponents in each expression. | Answers: |
|---|--------------------------|
| a) $12x^3y^2$ | 3, 2 |
| b) $62x^4$ | 4 |
| c) $2x^2y^1$ | 2, 1 |
| d) $125x^5$ | 5 |
| e) $9a^7$ | 7 |
| f) $-12x^0$ | 0 \Rightarrow constant |
| g) $-12ab^2c^1$ | 1, 2, 1 |

| 4) List the like terms in each of the following algebraic expressions? | Answers: |
|--|---------------------------------|
| a) $14xy^2 + 25x - 6x + 2$ | $25x, -6x$ $25x - 6x = 19x$ |
| b) $8x^2 + 12x^2 - 9xy + 3x$ | $8x^2, 12x^2$ $20x^2$ |
| c) $86x^3 + 42x - 36x^3 + 21y$ | $86x^3, -36x^3$ $50x^3$ |
| d) $4x^2 + 6y - 6x + 7y$ | $6y, 7y$ $13y$ |
| e) $36m^3 + 22m^2n^2 - 2m^2n^2 + 7m - 50$ | $22m^2n^2, -2m^2n^2$ $20m^2n^2$ |

Standard Form and Classifying Polynomials Practice

| | Standard Form | Classify by Degree | Classify by # of Terms |
|---------------------------|---------------|--------------------|------------------------|
| 1) $-2x^2 - 3x^5 + 7$ | | | |
| 2) 7 | | | |
| 3) $6x^4$ | | | |
| 4) $7x^2 - 2x^2$ | | | |
| 5) $-2 + 4x^4$ | | | |
| 6) $5x^5 + 3x^3 - 2 - 4x$ | | | |
| 7) $-6x^2 + 9x^2$ | | | |
| 8) $-2x^3$ | | | |
| 9) $7 - 8x + 4x^3$ | | | |
| 10) $7x^2$ | | | |
| 11) $5 + 9x^3 + 3x^3$ | | | |
| 12) $-5 + x$ | | | |
| 13) $-8x^4 - 8x$ | | | |
| 14) $3x - 5x^2 - 2$ | | | |
| 15) $3x^3 + x$ | | | |

DeltaMath

286813