

DAY 4_ EXPRESSIONS 🧐

Academic Vocabulary

Numerical Expression	Algebraic Expression	Equation	Inequality
Is a mathematical statement with only <u>numbers</u> and <u>operations</u> .	A group of terms that include <u>numbers</u> , <u>operations</u> , coefficients, and <u>variables</u> .	Is a mathematical sentence that separates two <u>expressions</u> by an <u>equal</u> sign.	Is a mathematical sentence that compares two <u>expressions</u> using an inequality sign.
Example(s) $2 + 3$	Example(s) $2x + 3$	Example(s) $2x + 3 = 7$	Example(s) $< \quad >$ $\leq \quad \geq$

Identify which of the following is either an numerical expressions, algebraic expressions, and equations.

a) $\frac{k}{6}$ b) $6 - 5$ c) $9 = 11m$ d) $p^3 \leq 5$ e) $(h)(h)(h) + 9$
expression expression Equation Inequality expression

CFU_Think-Pair-Share

Tell whether the following phrases are expressions, equations, or inequalities. Circle the key symbol.

1) $5x > 25$

2) $\frac{1}{2}x - 2$

3) $29 - k$

4) $8b + 9c < 45$

5) $\frac{xy}{12}$

6) $r - (-12) = 9$

7) $-4m = 16$

8) $h + (-9) \geq 3$

Algebraic Expressions

Coefficients & Variables

a) $4p + x^2$

Variable(s): p, x^2

Coefficient(s): $4, 1$

b) $8y - 6b$

Variable(s): y, b

Coefficient(s): $8, -6$

A **variable** is a letter that represents a unknown number.

A **coefficient** is the number in front of the variable.

Constants

b) $3c + 10$

Variable(s): c

Coefficient(s): 3

Constant: 10

b) $x - 8$

Variable(s): x

Coefficient(s): 1

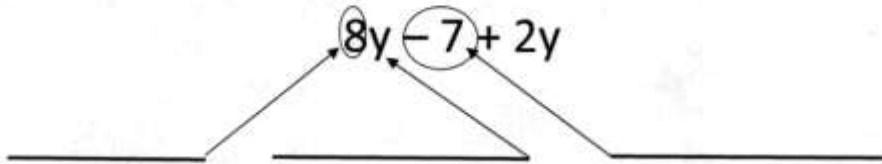
Constant: -8

A **Constant** is a number WITHOUT a variable.

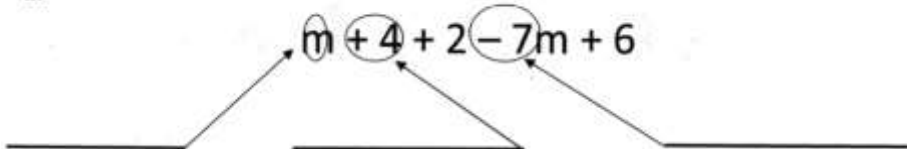
CFU_Think-Pair-Share

Label the parts of the expression: Coefficient, Constant, Variable

1.



2.



TERMS

Parts of an **algebraic expression** that are **separated** by addition and/or subtraction

EXAMPLES OF ALGEBRAIC EXPRESSIONS WITH...

ONE TERM	TWO TERMS	THREE TERMS	MORE THAN THREE TERMS
① $3x$	① $3x+1$	① $x+2-5b$	① $x+y+bx+c$
② $\frac{9b}{5}$	② $\frac{9b}{5}-7$	② $\frac{9}{4}+y-p$	② $\frac{x}{8}+b-2k+b$
③ 25	③ $14b+25$	③ $9k-5-3g$	③ $\frac{9}{11}k-5+\frac{c}{2}-3c$

CFU THINK-PAIR-SHARE

Directions: Identify the number of terms for each algebraic expression.

Example #1: x

Answer: ____ terms.

Example #2: $9k + 11$

Answer: ____ terms.

Example #3: $2x^2 - 12$

Answer: ____ terms.

Example #4: $5x^2 - 7y + 3$

Answer: ____ terms.

Example #5: $\frac{3m}{4}$

Answer: ____ terms.

Model

Directions: For the examples below state the number of terms and list the coefficients, variables, and constants.

Example #1	Example #2	Example #3
$7 - 8m$	$x^2 - 2x + 3$	$11x$
Number of terms: 2	Number of terms: 3	Number of terms: 1
List the terms: 7, -8m	List the terms: $x^2, -2x, +3$	List the terms: $11x$
Coefficients: -8	Coefficients: 1, -2	Coefficients: 11
Variables: m	Variables: x^2, x	Variables: x
Constants: 7	Constants: 3	Constants: none
Example #4	Example #5	Example #6
6	$3c - \frac{5}{7}c^6$	$3v + \frac{x}{4} - \frac{1}{2}$
Number of terms: 1	Number of terms: 2	Number of terms: 3
List the terms: 6	List the terms: $3c, -\frac{5}{7}c^6$	List the terms: $3v, \frac{x}{4}, -\frac{1}{2}$
Coefficients: none	Coefficients: 3, $-\frac{5}{7}$	Coefficients: 3, $\frac{1}{4}, -\frac{1}{2}$
Variables: none	Variables: c, c^6	Variables: v, x
Constants: 6	Constants: none	Constants: $-\frac{1}{2}$

CFU_Think-Pair-Share

- Identify the constant term in the expression:
 $2x + y + 3z + 5$
- Identify the like terms in the expression:
 $-12x + 15y - 17x + 16y$
- Identify the coefficient of term g^2 in the expression:
 $2f + 9g + 4g^2 - 3h$
- Identify the term with coefficient -3 in the expression:
 $9a^3 + 4b^2 - 3c + 11$
- Identify the coefficient of second term in the expression:
 $3x^2 + 7y^3 + 2x + 9y - 5y^2$

Model_

1) What is the coefficient for m^4 in the following expression $7 - 8g + m^4$?

Answer: 1

2) What is the sum of the coefficients in the expression $3d + 7f + k^2$?

$$3 + 7 + 1$$

Answer: 11

3) What is the sum of the coefficients in the expression $9h + 11p^3 - 5p$?

$$9 + 11 - 5$$

Answer: 15

4) What is the sum of the coefficients in the expression $9h + 11p^3 + 5p$?

$$9 + 11 + 5$$

Answer: 25

5) What is the sum of the coefficients in the expression $9 + 11p^3 - 5$?

Answer: 11

Check for Understanding _ Work with your partner!

1) Answer the following questions based on the expression $4e^4 + 11y - 5g + 3x + 2$

a) State the number of terms.

Answer: _____

b) State the constant.

Answer: _____

c) Determine the sum of the coefficients.

Answer: _____

2) Answer the following questions based on the expression $3d - 5 + 6d^2 + 11c$.

a) State the number of terms.

Answer: _____

b) State the constant.

Answer: _____

c) Determine the sum of the coefficients.

Answer: _____

3) Error Analysis:

Ms. Napolitano asked the class to determine the sum of the coefficients in the expression, $7g + 9p^3 - 5 - 6xy$. Kevin said the sum of the coefficients is 23. Zaire said the sum of the coefficients is 5 and Angelina said the answer is 10. Who is correct? Justify your answer.

Independent Practice

Directions: For the examples below state the number of terms and list the coefficients, variables, and constants.

Example #1	Example #2	Example #3
$5p + 4$	$7w + w^3$	$9k^4 + 8k - 11$
Number of terms:	Number of terms:	Number of terms:
List the terms:	List the terms:	List the terms:
Coefficients:	Coefficients:	Coefficients:
Variables :	Variables :	Variables :
Constants :	Constants :	Constants :
Example #4	Example #5	Example #6
$8b - x + 19$	$\frac{2c}{9}$	$4k - 9p - 1 + k^2$
Number of terms:	Number of terms:	Number of terms:
List the terms:	List the terms:	List the terms:
Coefficients:	Coefficients:	Coefficients:
Variables :	Variables :	Variables :
Constants :	Constants :	Constants :

Example #7:

3. Sarah was asked to identify all coefficients and constants of the expression $4 + n + 7m$. She said that 4 is a constant, and 7 is a coefficient.

What is her error?

- She did not include the constant 1.
- She said 4 is a constant. It is actually a coefficient.
- She did not include the coefficient 1.
- She said 7 is a coefficient. It is actually a constant.

Example #8: Determine the sum of each of the examples coefficients. Which algebraic expression has the greatest value the sum of coefficients?

$6p + 1$	$w + 10w^3$	$13k^4 + 12k - 5$
Sum:	Sum:	Sum:

The *algebraic expression* _____ has the greatest sum of coefficients.

1. $(3q) + 7q^2$	2. $12y + (20 \div 4)$	3. $64q + (20 + q)$	4. $9b - 4a + c$
Number of terms:	Number of terms:	Number of terms:	Number of terms:
List the terms:	List the terms:	List the terms:	List the terms:
Coefficients:	Coefficients:	Coefficients:	Coefficients:
Variables :	Variables :	Variables :	Variables :
Constants :	Constants :	Constants :	Constants :
5. $10x + 5y$	6. $2^3 + 4p$	7. $x - 5$	8. $a^2 - 6a + 75 + 8t$
Number of terms:	Number of terms:	Number of terms:	Number of terms:
List the terms:	List the terms:	List the terms:	List the terms:
Coefficients:	Coefficients:	Coefficients:	Coefficients:
Variables :	Variables :	Variables :	Variables :
Constants :	Constants :	Constants :	Constants :
9. $2^2 + c$	10. $9b - a + \frac{c}{7}$	11. $6.4w + 18.01$	12. $3r^2 + 4r + 8$
Number of terms:	Number of terms:	Number of terms:	Number of terms:
List the terms:	List the terms:	List the terms:	List the terms:
Coefficients:	Coefficients:	Coefficients:	Coefficients:
Variables :	Variables :	Variables :	Variables :
Constants :	Constants :	Constants :	Constants :

Example #13: Jennifer was asked to write the algebraic expression $8 \times 8 \times 8 \times 8 \times 8$ using exponents. Jennifer's wrote down 6^8 . Is Jennifer correct? Justify your answer.

Example #14: Kennedy and Courtney are having a disagreement about how many terms $\frac{7x}{9}$ has. Kennedy says that it is one term, but Courtney says its two terms. Who is correct? Justify your answer.

State Questions

Example #1

Simplify the expression below.

$$7^2 - 9 + 1^3$$

- A** 37
- B** 39
- C** 41
- D** 43

Example #2

What are the coefficients in the expression $-8y^2 + 12x + 5y + 7$?

- A** 5, 8, 12
- B** -8, 5, 12
- C** -8, 5, 7
- D** 5, 7, 12

Example #3

For which expression is the sum of the constants greater than the sum of the coefficients?

- A** $7 + 3x^2 + 7x + 3$
- B** $7 + 4x^2 + 4x + 1$
- C** $8 + 4x^2 + 8x + 2$
- D** $8 + 3x^2 + 7x + 4$

Example #4

Which expression is equal to $a \times a \times a \times b \times b$?

- A** a^2b^3
- B** a^3b^2
- C** $3a \times 2b$
- D** $3a^3 \times 2b^2$

Example #5

Which expression is equivalent to the expression $\left(\frac{1}{2}\right)^3$?

- A** $3 \times \frac{1}{2}$
- B** $\frac{1}{2} + \frac{1}{2} + \frac{1}{2}$
- C** $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$
- D** $3 + \frac{1}{2}$

Example #6

Which expression is equivalent to $\frac{27}{125}$?

- A** $\left(\frac{3}{5}\right)^3$
- B** $\frac{3}{5^3}$
- C** $\left(\frac{3}{4}\right)^2$
- D** $\frac{3^3}{5^5}$

Example #7

Which expression has the *least* value?

- A $5^2 + 4^3$
- B $4^2 - 5^3$
- C $3^4 + 5^2$
- D $2^5 - 3^4$

Example #8

The expression $(8 - 3)^2 - (5 - 2)^2$ is equivalent to which of the following numerical expressions?

- A $5 - 3$
- B $25 - 9$
- C $(5 - 3)^2$
- D 2^5

Example #9

How many factors in the expression $8(x + 4)(y + 4)(z^2 + 4z + 7)$ have exactly two terms?

- A 1
- B 2
- C 3
- D 4

Example #10

What is the value of $5^2 + 4^3$?

- A 22
- B 41
- C 81
- D 89

