

Variables and Expressions

Vocab:

- Variables - symbol used to represent unknown values
- Constant - value that doesn't change
- any number without a variable part
- Coefficient - a number multiplied by a variable
- Algebraic Expressions - combination of variables and constants using operations (+, -, x, ÷)
- Term - piece of an expression
 - Variable term
- contains a variable
 - Constant term
- does not contain a variable
- Factors - numbers multiplied to get a new number (or variable)
- Power x^n
- Exponent - indicates the number of times the base is multiplied
- Base - the number being multiplied.

Algebra to Words, Words to Algebra

+	Addition, sum, adding, added plus, increase, gain, more	-	subtracting, decrease, less, minus, lower, fewer difference
x	multiply, product factors, times,	÷	

Exponents: $x^2 = x$ squared $\leftrightarrow x$ to power 2
 $x^3 = x$ cubed $\leftrightarrow x$ to power 3

Example: Write a verbal expression for the algebraic expression (symbols to words)

a) $5x^4$

b) $16u^2 - 3$

Practice: Write a verbal expression for the algebraic expression (symbols to words)

a) $8x^2$

b) $y^5 - 16y$

Opposite Way:

Example: Write an algebraic expression for the verbal expression:

10 less than the product of 7 and f

$$7f - 10$$

Practice: Write an algebraic expression for the verbal expression:

9 plus the product of two-fifths and x

$$9 + \frac{2}{5} \cdot x$$

Variables can represent quantities that are known and quantities that are unknown. They are frequently used in formulas, expressions, and equations. If variables are not given but there are unknowns, we must define the variables we use.

Words: Katie buys 40 pastries and coffee for 200 people in her office. Write an algebraic expression that represents the cost of the order. Define the variables you use.

Let p = cost of pastry
 c = cost of coffee

$$40p + 200c$$

Practice: Mr. Rad bought two adult tickets and three students tickets for a show. Write an expression that represents the cost of the tickets.

Let a = cost of adult
 s = cost of student

$$2a + 3s$$

Notes: Order of Operations

Objective: Students will be able to use the order of operations to evaluate expressions.Evaluate $7 + 4 \cdot 3$

19, 33

Two different answers are common depending on which operation you do first. We want everyone to get the same answer so we must follow the

Order of Operations
(OOOP)ORDER OF OPERATIONS

1. : Parenthesis (grouping)

2. : Exponents

3. : Division or Multiplication

4. : Addition or Subtraction

Once again, Evaluate $7 + 4 \cdot 3$

from left to right

Examples:

1. $14 \div 7 \cdot 2 - 3$

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2. $3(3+7)^2 \div 5$

$$3(10)^2 \div 5$$

$$3 \cdot 100 \div 5$$

$$300 \div 5 = 60$$

3. $20 - 3 \cdot 6 + 10^2 + (6+1) \cdot 4$

$$130, 117, 237, 128$$

$$20 - 3 \cdot 6 + 100 + 7 \cdot 4$$

$$20 - 18 + 100 + 28$$

$$130$$

4. $11^2 + 18 - 3^3 \cdot 5$

$$4, 560, 274, -6, -95$$

$$121 + 18 - 27 \cdot 5$$

$$121 + 18 - 135$$

$$4$$

5. $16 - 2(10 - 3)$

6. $24 - 6 \cdot 4 \div 2$

Evaluating a Variable Expression

1. Substitute

2. Use order of operations to solve

1. $n + (13 - n) \div 5$ for $n = 8$

$$8 + (13 - 8) \div 5$$

$$8 + 5 \div 5$$

$$8 + 1 = \boxed{9}$$

2. $-10 - 4x$ if $x = -13$

$$42$$

3. $5k^3$ if $k = -4$

$$5(-4)^3$$

$$5 \cdot -4 \cdot -1 \cdot -4$$

$$-20 - 4 \cdot -4 = \boxed{-320}$$

4. $8y - 3x^2 + 2n$ for $x = 5$, $y = 2$, $n = 3$

$$-53$$

5. $\frac{(2n + m)}{t}$ if $n = -8$, $m = 4$, and $t = 2$

$$\frac{2 \cdot -8 + 4}{2} = \frac{-16 + 4}{2} = \frac{-12}{2}$$