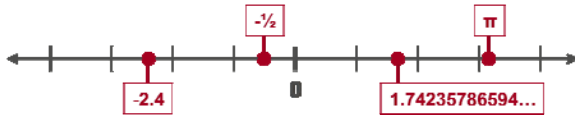


01: Introduction to Pre-Algebra

Key Terms

- **Algebra:** a branch of mathematics in which symbols, usually letters of the alphabet, are used to represent numbers and quantities.
- **Algebraic expression:** a quantity that combines variables, numbers, and operation symbols.
- **Area:** the amount of space inside a two-dimensional shape.
- **Equation:** a mathematical statement in which two or more expressions are set equal to each other.
- **Inequality:** a mathematical statement comparing two or more expressions using $<$, $>$, \leq , and \geq .
- **Like terms:** two or more terms that have the same variable raised to the same power.
- **Linear equation:** an equation that represents a line.
- **Polynomial:** an expression made up of terms containing variables with whole number exponents.
- **Probability:** a number from 0 to 1 that tells how likely an event is to happen.
- **Real number:** any number that can be represented with a point on the real number line.



- **Solution of an Equation:** the value that makes an equation true when the variable is replaced by the value.
- **Term:** a variable, number, or the product of a number and a variable.
- **VANG:** an acronym used to remember the four ways an algebraic relationship can be expressed: verbal, analytical, numerical, and graphical.
- **Variable:** a symbol that is used to represent a quantity.
- **Volume:** the amount of space enclosed in a solid object.

Evaluating Algebraic Expressions

To evaluate an algebraic expression, substitute a given number for each variable and find the value of the resulting numerical expression.

Example: Evaluate the expression for the given values.

$$2m - 3n + 7 \text{ for } m = 8 \text{ and } n = 5$$

Solution:

$$\begin{aligned} 2m - 3n + 7 &= 2(8) - 3(5) + 7 \\ &= 16 - 15 + 7 \\ &= 8 \end{aligned}$$

Combining Like Terms

To combine like terms, add the coefficients and keep the same variable and power.

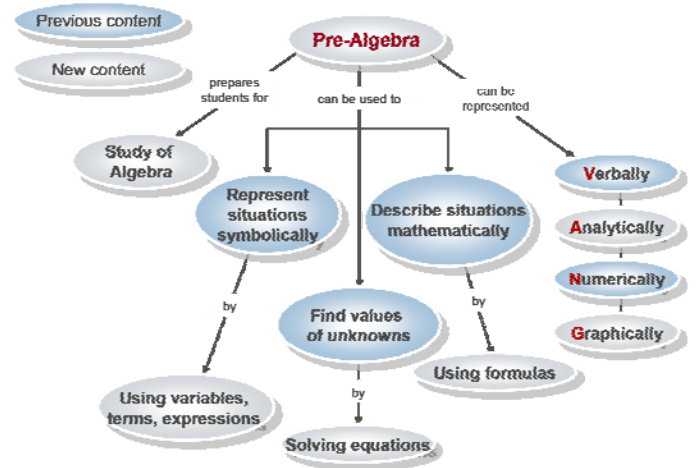
Example: Combine the like terms.

$$10u - 13v - 8u + 7v$$

Solution:

$$\begin{aligned} 10u - 13v - 8u + 7v &= 10u - 8u - 13v + 7v \\ &= (10 + (-8))u + (-13 + 7)v \\ &= 2u - 6v \end{aligned}$$

Concept Map



Simplifying Algebraic Expressions

To simplify an algebraic expression, perform all possible operations and combine like terms.

Example: Simplify the expression.

$$5(x - 2y) + 4x$$

Solution:

$$\begin{aligned} 5(x - 2y) + 4x &= 5x - 10y + 4x \\ &= 5x + 4x - 10y \\ &= (5 + 4)x - 10y \\ &= 9x - 10y \end{aligned}$$

Calculator Tips

- Enter a negative number using $(-)$, not $-$.
- Simplify numerical expressions before entering them into a calculator to reduce input errors.
- Most calculators use order of operations to evaluate. Use parentheses when necessary.
- Make sure all parenthesis pairs are complete: each set contains a left and a right parenthesis.

Tips and Reminders

- Pre-Algebra prepares students for the study of Algebra.
- The study of Algebra causes the brain to work like a muscle. The more the muscle works out, the better it performs on other types of tasks.
- The VANG method looks at a situation verbally, analytically, numerically, and graphically.
- Pre-Algebra involves variables, terms, and expressions.
- Combine like terms by adding their coefficients.
- Study daily and keep up the pace.
- Practice problem solving and do all assigned homework.
- Take notes in class and while reading the textbook.
- Seek help from teachers and classmates.
- Connect new topics to things you already know.
- Be persistent.
- Believe in yourself. Keep trying and eventually you'll get it.

How to Use This Cheat Sheet: These are the keys related this topic. Try to read through it carefully twice then recite it out on a blank sheet of paper. Review it again before the exams.