

<b>MA 6A</b>	<b>Mathematics Embedded Credit</b>
Cape Career & Technology Center	<b>Last Update: April 2017</b>
<b>Topic: Basic Algebra</b>	<b>Focus: Evaluate Expressions</b>

Show-Me Standards: MA1, MA2, MA4	MO Grade Level Expectations: N2C8, N2C9, A2B7	NCTM Standards: 4A, 5A
----------------------------------	---	------------------------

**OBJECTIVE:** Students will be able to solve or simplify simple algebraic equations.

**Introduction:**

Before working with algebraic expressions, it is important to know some basic definitions.

**Algebraic Expression:** A phrase of mathematical origin that is made up of various numbers, letters and operations.

**Equation:** An algebraic statement that two algebraic expressions are equal.

**Variable:** An expression in an algebraic equation that represents one, or more, value in any one expression.

**Constant:** A value that does not change. May be a number, or a representation of a number.

**Term:** Part of an algebraic expression, it is the part of the equation separated by a mathematical operation.

**Factor:** Each number or letter of a term that is formed by two or more symbols multiplied together to form a product.





**Numerical Coefficient:** The product of all factors of a term that are in number form.

**Polynomial:** An algebraic expression of one or more terms.

**Monomial:** A polynomial of only one term.

The use of Algebra requires one to know how to think about solving equations. Although the process of solving equations seems difficult it is important to know how to take steps to solve the equation. Almost every job, or career path, has to work with equations, or formulas. Solving equations and formulas for an 'unknown' (variable, see above) is a basic task that every vocational student needs to master.

The keys elements to solving equations are contained in the following statements of procedures:

-  Identify the variable (if there is more than one, a single equation cannot be solved).
-  If the information is being collected in the shop or from a word problem, make sure you have all of the data.
-  Isolate the variable that you are attempting to solve for. This is accomplished by removing all the other constants or numbers to the other side of the equation.
-  Always combine the like variables using the information from 'Basic Operations' lessons from Integers; Fractions, Decimals, and Percent; Exponents, Square Roots, Scientific Notation; and Ration and Proportion lessons.

- $2x + 3x = 5x$
- $6y - 4y = 2y$
- 📖 To remove the other numbers from the side with the variable, you must perform the inverse, or opposite operation.
  - Addition and subtraction are inverse operations.
  - Multiplication and division are inverse operations.
  - When performing an inverse operation, the equation must be balanced by doing the same operation on both sides of the equation.
- 📖 It is good to always check your answer to see if the answer is correct.

**EXAMPLES:**

To Solve:

$2x + 3 = 9$	The first step is to remove the three from the left side of the equation.
$2x + 3 - 3 = 9 - 3$	The three is subtracted from both sides of the equation.
$2x = 6$	The result is obtained and written as the new equation.
$\frac{2x}{2} = \frac{6}{2}$	The next step is to remove the two from the left side equation. To reduce, the left and right side of the equation are divided by the number, two.
$x = 3$	The <b>ANSWER</b> .
$2(3) + 3 = 9$	<b>CHECK</b> the ANSWER.
$6 + 3 = 9$	The ANSWER is <b>CORRECT</b> .

To Simplify:

$-2x(3x^2 - 4x + 8)$	The first step is to multiply the $-2x$ into the parenthetical.
$[(-2x * 3x^2) - (-2x * 4x) + (-2x * 8)]$	Next you will want to simplify the expressions in the parenthesis.
$[(-6x^3) - (-8x^2) + (-16x)]$	Next, carry the operations through the terms to make one clear expression.
$-6x^3 + 8x^2 - 16x$	The <b>ANSWER</b> in its simplest form.

**PROBLEMS: Solve or Simplify the Following.**

1.  $3x + 5x - 6x = 64$

2.  $4x^2 + 3x^2 + 5x - 8x$

3.  $5x^3 + 3x^3 - 6x^3$

4.  $3(2x + 5) = 35$

5.  $3x^2(2x^4 + 3x - 5)$

6.  $(2x^3 - 4x - 5) + (5x^3 - 3x - 12)$

7.  $\frac{3x^2}{6x} = 28$

8.  $\frac{12x^4y^3}{4x^3y}$

9.  $(2x^2 + 3x - 5) + (4x^2 - 2x - 12)$

10.  $(5x^3 - 3x^2 + 3x - 2) - (3x^3 - 5x^2 + x - 15)$

11.  $5(2x^3 - 4x^2 + 3x - 6)$

12.  $-2x(3x^2 - 4x + 8)$