

<b>MA 1A</b>	<b>Mathematics Embedded Credit</b>
<b>Cape Career &amp; Technology Center</b>	<b>Last Update: April 2017</b>
<b>Topic: Integers</b>	<b>Focus: Order of Operations</b>

<b>Show-Me Standards: MA1, MA5</b>	<b>MO Grade Level Expectations: N2b9, N2C9</b>	<b>NTCM Standard: 2A</b>
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**OBJECTIVE:** Students will be able to use proper order of numeric operations to solve and/or simplify arithmetic and algebraic problems.

**Introduction:** When working with an arithmetic expression such as  $12 + 3 / 5$ , or an algebraic equation such as  $3x + 9 = 18$ , there is an established order for the arithmetic operations to be performed. If the proper order of operations is not followed, an incorrect answer may result.

When solving, or simplifying, an arithmetic expression, the following order of operations needs to be followed. Each level will be repeated until that operation is no longer used.

### RULES FOR ORDER OF OPERATIONS

Operations *MUST* be performed in this order:

-  Start with grouped symbols, starting with the innermost parentheses and working outward.
-  Next, perform powers and roots in any order.
-  Then, multiplication and division in order from *LEFT* to *RIGHT*.
-  Finally, addition and subtraction in order from *LEFT* to *RIGHT*.

**EXAMPLE:**

Simplify the following:  $4 - 3^2 - (3 - 2^2 + 1)$

Step #1: Work inside the parentheses.  $(3 - 2^2 + 1) = (3 - 4 + 1) = (-1 + 1) = 0$

Step #2: Work out powers and roots.  $4 - 3^2 - 0 = 4 - 9 - 0$

Step #3: Addition and subtraction in order from LEFT to RIGHT.  $4 - 9 - 0 = -5 - 0 = -5$

**GUIDED PRACTICE:**

1.)  $\frac{25 \cdot 3 + 25}{5} = \underline{\hspace{2cm}}$

2.)  $\frac{9 + 3 \cdot 2}{6} = \underline{\hspace{2cm}}$

3.)  $(5 + 3)^2 + \frac{144}{12} = \underline{\hspace{2cm}}$

4.)  $32 + 5 \cdot (90 - 45 \cdot 2) = \underline{\hspace{2cm}}$

5.)  $15 - 3 \cdot 2 + \left(\frac{8}{4}\right)^2 = \underline{\hspace{2cm}}$

6.)  $3^2 + 3^3 \div 9 + 72 \div (5 + 4) = \underline{\hspace{2cm}}$