

Name: _____

Date: _____

Mrs. Rowm 1005

Order of Operations and Evaluating Algebraic Expressions Algebra 1

Exercise #1:

- (a) Evaluate $3+4\times 5$ by: adding first: _____ multiplying first: _____
- (b) Are both answers above correct? _____
- (c) Which answer is correct? _____ Why?

As *Exercise #1* above illustrates, the order in which we perform operations on numbers matters. In middle school, you learned the order to follow when evaluating numerical expressions. The order is summarized below:

- 1st - Perform operations within parentheses.
- 2nd - Evaluate expressions that contain exponents.
- 3rd - Multiply and divide in the order that they appear from left to right.
- 4th - Add and subtract in the order that they appear from left to right.

We **must** follow this order; otherwise, we couldn't possibly communicate mathematically. When we all look at a numerical expression, we all **must** interpret it the same way.

Exercise #2: Evaluate each of the following numerical expressions **without** the use of a calculator.

(a) $(-3)(-5)+2$

(d) $6\cdot 5+6\div(-2)$

(g) $-2(3^2+4^2)$

(b) $2(3)^2$

(e) $(-1)(-3)^2+9$

(h) $5(\sqrt{100}-\sqrt{64})$

(c) $4-6\cdot 2$

(f) $\frac{18-3\cdot 4}{5-2}$

(i) $6-2^2\cdot 4+2\sqrt{25}$

Exercise #3: Fiona evaluated the expression $\frac{12+6}{2+4}$ as follows using her graphing calculator. The display is shown at the right. Explain why Fiona obtained an incorrect answer.

$12+6/2+4$	19
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Exercise #4: Evaluate each of the following numerical expressions using your calculator. Round all answers to the *nearest hundredth*, where appropriate.

(a) $\pi(4.2)^2 + 2\pi(4.2)(3.1)$

(c) $12(2.5) + 16(2.5)^2$

(b) $2\pi\sqrt{12/9.81}$

(d) $\frac{4(1-2.14^3)}{1-2.14}$

Oftentimes we are asked to evaluate formulas or algebraic expressions for given replacements of their variables.

Exercise #5: If $V = \pi r^2 h$, then find the value of V if $r = 2$ and $h = 8$. Round your answer to the *nearest hundredth*.

Exercise #6: If $V = \frac{4}{3}\pi r^3$, then find the value of V if $r = 12$. Round your answer to the *nearest hundredth*.

Exercise #7: If $c = \sqrt{a^2 + b^2}$, then find the value of c , to the *nearest tenth*, if $a = 45$ and $b = 17$.

Exercise #8: If $x = -3$, then find the value of each of the following algebraic expressions.

(a) $2x + 1$

(c) $-4x - 2$

(e) $-x^2 + 4$

(b) $x^2 - 2x + 3$

(d) $-3x^2 + 6x$

(f) $\frac{2 + \sqrt{x + 19}}{6 - 2x}$