Math 101, Littlefield
Homework: Arithmetic in Visual Notation and Single-Line Notation

Objective: practice and demonstrate mastery of two common notations for basic arithmetic.

Instructions: This homework provides an assortment of *arithmetic expressions*, written in ordinary *visual notation*. For each of these expressions, your tasks are to

1. Write one *equivalent expression* in *single-line notation*, using the minimum number of parentheses needed to specify the correct *order of operations* using the *PEMDAS* rules.

2. Write another *equivalent expression* in single-line notation, using parentheses around <u>every</u> *operator* and its *operands* to show the order of operations implied by PEMDAS.

3. *Evaluate* the expression. (That is, actually do the arithmetic and tell me what the *value* of the expression is. Because all three expressions are equivalent, they all must have the same value.)

Example:

First, let me use lots of words to spell out what I mean**:**

Suppose you have this expression in visual notation: $\dfrac{60 - 2 * 21}{2 + 1}$

In single line notation, with the minimum number of parentheses, it is:

(60-2*21)/(2+1)

Fully parenthesized to completely show the order of operations, it is:

((60-(2*21))/(2+1))

All of these expressions evaluate to the value 6.

Second, here is what I want you to actually write down and hand in, for me to check:

$\dfrac{60 - 2 * 21}{2 + 1}$ **= (60-2*21)/(2+1) = ((60-(2*21))/(2+1)) = 6**

Problems:

1. $\dfrac{50 - 4 * 2}{6 + 1}$

2. $\dfrac{45}{3 * 5}$

3. $\dfrac{1}{2} \cdot 49 \cdot (11 + 13)$

4. $\dfrac{1}{3} \cdot 10 \cdot 20 \cdot 30$

5. $\dfrac{2 \cdot (10 + 5)}{7 + 8}$

6. $100 / 5 / 2 * 4$

7. $\dfrac{4 \cdot 21 + 7}{14 - 7}$

8. $\dfrac{4 \cdot 21 + 7 \cdot 13 + 7}{13}$

9. $\dfrac{-2 \cdot 4 + 4}{4}$

10. $\dfrac{1}{\dfrac{1}{3} + \dfrac{1}{6}}$