MTH 23.5 LECTURE NOTES (Ojakian)

Topic 1: Arithmetic, Order of Operations, Excel

OUTLINE

References (**Algebra Book**: p.35-39; **Statistics Book**: None)

1. Arithmetic
2. Order of Operations
3. Excel

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1. Ok, let's remember our numbers! ...: Number Line.

   Definition 1. *The **number line** is a horizontal line going infinitely far to the right and left with the following properties:*

   (a) Zero is in "middle"
   (b) Positive numbers to right of zero
   (c) Negative numbers to left of zero
   (d) Left is smaller. Right is larger.
   (e) Discuss: $<$ and $>$ and $\leq$ and $\geq$.

2. Types of Numbers

   Definition 2. *A **real number** is any number on the Number Line.*

   Definition 3. *An **integer** is a whole number, which is positive, negative, or 0.*

   PROBLEM 1. *Which of the following numbers are integers:* 9, 5/4, 4/5, 10.4, 10, -19, 0.7, 0

3. Adding and Subtracting Numbers

   (a) Minus sign used in 2 ways:
      i. In between expressions: Subtraction operation
      ii. In front of expression: Take "opposite"
   (b) Using the number line
      i. Start at 0
      ii. Add Positive: Move right
      iii. Add Negative: Move left
      iv. Subtract Positive: Move left
      v. Subtract Negative: Move right
   (c)

   PROBLEM 2. *Compute the following:* $5 + 2 + (-4) - (-5)$

4. Multiplying and Dividing

(a) As usual with the following sign rules.
   i. Positive and Positive → Positive
   ii. Negative and Positive → Negative
   iii. Negative and Negative → Positive

(b)

PROBLEM 3. *Compute the following:*

i. $(4)(-5)$

ii. $-10 \div (-2)$

5. Excel
   (a) Cell
   (b) Sheet
6. Three Kinds of Cells
   (a) Text
   (b) Numeric
   (c) Function
7. Functions in Excel
   (a) Always start with Equal Sign: $=$
   (b) Basic arithmetic, ex: $= 3 + 4$, or $= A2 + A3$
   (c) Absolute and Relative referencing when coping:
      i. Example of absolute: \$A\$5
      ii. Example of relative: A5
8. Order of operations
   (a) The order (**PE(MD)(AS)**):
      i. Inside parentheses first (*and absolute value*)
      ii. Exponents
      iii. Products and division
      iv. Addition and subtraction
      v. Read left to right
   (b) Note: Often put in extra parentheses for emphasis.

PROBLEM 4. *Compute the following*

i. $7 + 8 \cdot (-1)$

ii. $(7 + 8) \cdot (-1)$

iii. $7 \cdot (-3) + 6/2$

iv. Consider the last expression.
- *Insert parentheses into the last expression so that it is evaluated from left to right. Then evaluate it.*
- *Insert parentheses into the last expression so that it is evaluated from right to left. Then evaluate it.*

v. $3 + (-5)2^3$

vi. $(-2)^4$ *versus* -2^4

vii. $(-2)^3$ *versus* -2^3