Numbers 3 & Concepts

Mathematics and Millennials – 6th

Collaboration & Facilitation

Garden Approach Advocates and Promotes!

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Students Collaborate & Teachers Facilitate!

Blends Traditional & Contemporary resources!

Concepts & Computations integrated together!

Counting & Whole Numbers

Counting & Whole Numbers are basic number sets!

1,2,3,4, etc… 0,1,2,3,4 etc….

A important number added to our system was Zero!

Not all number systems have a Zero!

Fraction Numbers

Mathematicians gather into special societies
and discuss the possibility of using fractions!

They were punished for non-conventional thinking.
Hiding allow non-traditional thinking to continue.

The quest for different number types was constantly
discussion and excited Mathematicians.

Numerals & Numbers

Concrete Symbols & Abstract Ideas!
Numerals are Symbols! Numbers are Ideas!

Whole Numbers 1,2,3,4,… | || ||| |||| …

Fractions 1/2, 2/3, 3/4, … # / ##, ## / ###, ### / ####

What about Mixed Numbers and other number types?

Mixed Numbers

Symbols & Ideas!
A Natural Extension of Whole & Fractions!

Whole Numbers 1,2,3,4… Fractions 1/2, 2/3, 3/4…

Mixed Numbers: 3 2/5 6 3/7 9 7/8…

What about Decimals and other number types?

Decimal Numbers

Decimals (special fractions) .3 .86 .427 …
with denominators of 10, 100, 1000… Special Notation!

Astronomers used Scientific Notation which
uses Decimal Numbers and Powers of Ten!

Thank to our forefathers for creating decimals
since we might not have calculators without them.

Signed Numbers

Many situations of the Real World require numbers
which is a value below zero (0).

Number Systems are from all over the world!
Who invented negative numbers?

Integers: … -3 -2 -1 0 +1 +2 +3 …

Real Numbers

Rational & Irrational Numbers: (Number Line)

Rational Numbers:
Whole, Fractions, Mixed, Decimals, Integers,…

Irrational Numbers:
Non-repeating & Non-terminating Decimals?

Powers of Ten

English & Metric Systems use Powers of Ten

Positive Powers of Ten	Negative Powers of Ten
$1000 = 10^{+3}$	$.001 = 10^{-3}$
$100 = 10^{+2}$	$.01 = 10^{-2}$
$10 = 10^{+1}$	$.1 = 10^{-1}$
$1 = 10^{0}$	$1 = 10^{0}$

Scientific Notation - 1

Scientific Notation

A number between 1 & 10 times a power of 10!

Large Numbers	Scientific Notation
8,527,000	____ x 10
3,265,918,500	____ x 10
2,794,000,000,000	____ x 10

Scientific Notation - 2

Scientific Notation

A number between 1 & 10 times a power of 10!

Small Numbers	Scientific Notation
.0000075	____ x 10
.00000000329	____ x 10
.00000000000562	____ x 10

Structure & Principles

The Properties of Mathematics:

Closure:	**Sets**
Commutative:	**Order**
Associative:	**Grouping**
Identify:	**Does not change!**
Inverse:	**Changes to Identity!**
Distributive:	**Two operations together!**

Whole Numbers as Fractions…

Whole Numbers & Fraction Equivalents!

3 = 3/1 6 = ____ 7 = 7/1 9 = ____

What happens if we flip these over:

4 flipped 1/4 Flips are called Inverses!

5 flipped 1/5 What else are they called?

What happens when (____) x (____) = 1 ???

Decimals as Fractions…

Decimals

Special denominators: 10, 100, 1000,…

Written with special point for short notation.

Decimals converted to Fractions:

.3 = ____ .06 = 6/100 .047 = _____

2.9 = ____ 5.08 = 5 8/100 6.005 = _____

Fractions to Decimals…

Fractions converted to Decimal equivalent.

3/4 => 4) 3.00 = .____ 5/8 => 8) 5.000 = .625

2 1/2 = 2.___ 3 4/5 = 3.8 4 2/3 = 4.____…

Conversion from one number type to another type!

Percents to Fractions & Decimals…

Percents

Concept & Symbol related to 100.

Thus % means or is equal to 100

35% = 35/100 150% = _____ 6% = ____

75% = ____ 350% = ____ 7% = .07

Fractions to Decimals to Percents…

Percents

Concept & Symbol related to 100.

Change Fraction to Decimal then to Percent!

3/4 => 4) 3.00 = .75 = ___ %

5/8 => 8) 5.000 = .625 =_____ %

2 1/2 = 2.5 = ____% 3 4/5 = 3.8 = ____%

Least Common Multiple

Divisible by special smaller numbers!
Multiple means division without a remainder!

Find multiples for given and determine LCM!

2 = ( )
3 = ( )

Least Common Denominator

LCD is divisible by smaller numbers.
Division without a reminder! Used with Fractions!

Given 4/5 & 2/3! LCD for Addition/Subtraction?

5 = ( )
3 = ( )

Using a LCD with Fractions…

LCD is divisible by two smaller numbers.

Given: 2/3 & 3/4: LCD for Addition or Subtraction!

Addition: 2/3 + 1/4 = /12

Subtraction: 2/3 - 2/5 = /15

Cross Multiply Method is quick and simple to use!

Extended Exponents…

Exponents are Special Multiplication!

2/3 x 2/3 = 4/9 1/2 x 1/2 = ____

4/5 x 4/5 = ____ 6/7 x 6/7 = 36/49

Extending Concept…

$(2/3)^2$ = ____ $(1/2)^2$ = 1/4

$(4/5)^2$ = 16/25 $(6/7)^2$ = ____

Extended Radicals…

Radicals (Sq. Roots) are Special Division!

.4 x .4 = .16 .3 x .3 = .09

.5 x .5 = ____ .02 x .02 = _____

Extending Concept:

√.16 = ___ since .4 x .4 = .16

√.09 = ___ since .3 x .3 = .09

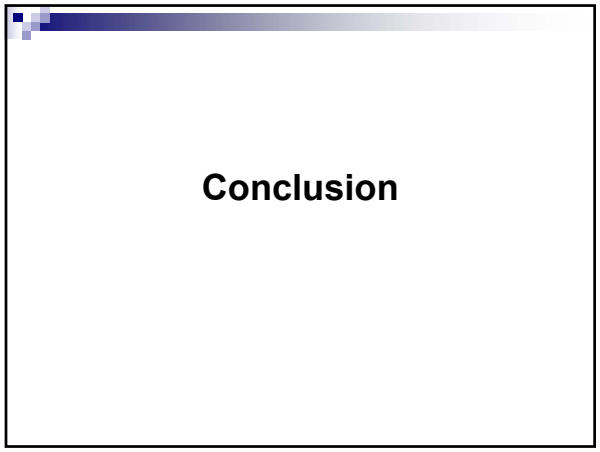
Order of Operations…

Please Excuse My Dear Aunt Sally

Parenthesis,Exponents,
Multiplication, Division, Addition Subtraction

$9 - 7 + 4[7 + (5 - 1)^2]$
$9 - 7 + 4[7 + (4)^2]$
$9 - 7 + 5[7 + 16]$
$9 - 7 + 5[23]$
$9 - 7 + 115$
$2 + 115 = 117$

$[(4 + 1)^2 -3]/2 + 5 -1$
$[(5)^2 - 3]/2 + 5 -1$
$[25 -3]/2 + 5 -1$
$[22]/2 + 5 -1$
$11 + 5 -1$
$16 - 1 = 15$


Conclusion