

What to bring to class:
Ask students to bring PM
4A and 5A.

1.1 Counting

Go over syllabus (10 min - Talk thru)

1. * Taught by a mathematician
* Emphasis on mathematics actually taught in Elem. school.

I do mathematics and teach it - full time

2. Graded like a math course

3. Go over point system; how to work in groups on HW.

4. Texts: Singapore & Math for Elem. Teachers

Elem. School Math is familiar, but not trivial.

Teacher must know:

- * why things are true
- * how to explain them in several ways
- * pitfalls

Types of elementary questions:

Why is $(-1) \times (-1) = 1$?

How do you show the area of a circle is πr^2 ?

Make up a word problem for $\frac{3}{4} \div \frac{1}{2}$?

Why does long division work? What must students know as background before learning long division?

Section 1.1 Place value and Models for Arithmetic

Numbers are abstract ideas: 3 apples \rightarrow 3 pears

Small numbers innate (say: built into our brains, chimpanzees recognize "3")

Def The whole numbers are 0, 1, 2, 3,

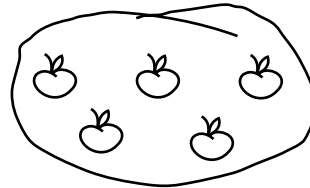
when used to count: Cardinal; when used to order: Ordinal

Taught by

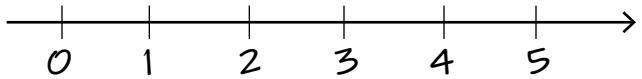
- * Counting chants: "1, 2, 3, 4,"
- * Counting exercises: "How many _____?"
- * Patterns :: \longleftrightarrow 4

based on

- * Set model



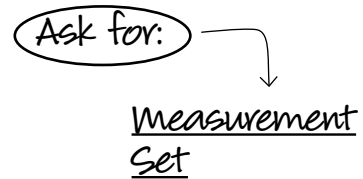
- * Measurement model



(say: number line - simplest meas. model)

Examples: Number of

- (a) Weeks so far in the millennium
- (b) People on Earth
- (c) The height of the Sears Tower in feet
- (d) Moons of Jupiter



(Say: This can be formalized with set theory, not used in elem. school)

We write numbers as symbols called numerals

(Say: A simple progression of 3 systems leads to the numeration system used today.)

I. Tally I, II, III, IIII, intuitive, but try 989!

II. Egyptian Tallies up to 9, then

heelbone	n	for 10
scroll	e	for 100
lotus	⌚	for 1000

Ask: What does ee n n n IIII represent? shorter, clear, but try 989!

III. Decimal Numerals: uses ten symbols 0, 1, 2, 9:

ee	nnn	IIII
↓	↓	↓
2	3	4
hund.	tens	ones

The value of the digit depends "on its position within the number," this is called place value.

Advantages of the
Decimal numeral system:

* Easy to record very large #'s :

127, 671, 238, 541, 265
trillions billions millions thousands

* Extends to record numbers with arbitrary accuracy:

127.381

* Much easier to multiply and divide

* Used throughout the world.

If time:

Roman numerals are used & should be taught

Basic	{	I		Shortened by	V ↔ 5
		X ↔ 10			L ↔ 50
		C ↔ 100 ("century")			D ↔ 500
		M ↔ 1000 ("millennium")			

$$\text{MCCLXVII} = \frac{1267}{\text{ASK}}$$

$$784 = \frac{\text{DCCLXXXIIII}}{\text{ASK}}$$

or

IV

"subtractive principle"

HW Read introduction pg 1 - 5
Read S 1.1 Do HW set 1
(pg 6 - 10)