Math 1350: Math for Elementary School Teachers

Professor: Dr. Alm

4 Exams and Final Exam
→ 1st Exam: Thursday of 3rd week (9/13)

Every Tuesday HW will be assigned which is due the following Tuesday.

There will be a daily understanding Quiz.

Course Philosophy: "To Know a fact in Mathematics means:

a) to know that it is true
b) to know why it is true
c) to know why it matters
d) to know context of the fact

Ch. 1.1: How to Count

0 1 2 3 4 5 6 7 8 9 (Hindu–Arabic Numerals)

Original 10 Symbols

00 01 02 03 04 05 06 07 08 09
10 11 12 13 14 15 16 17 18 19
20...

Leading value specifies how many rows have been completed:

90 91 92 93 94 95 96 97 98 99
What would the symbol $48$ mean in the number grid from 00 to 99?

-> The leading 4 indicates that 4 complete rows must be counted before arriving at the 8 column that holds the value 48.

What if we wanted to describe a number larger than 99?
Another symbol place holder must be introduced.

000 ........... 099

100

\[ \begin{array}{c}
557 \\
900 \\
999
\end{array} \]

In the number 557, the right-most digit is called the ones digit, the next digit to the left is the tens digit, and the next is hundreds.
Alien race with only 1 hand with 3 fingers.
Suppose they have a counting system comprised of symbols: 0 1 2
How many numbers come before 21?

- Answer: 7

\[
\begin{align*}
&\phantom{=} 3 \quad 00 \quad 01 \quad 02 \\
&\phantom{=} 13 \quad 10 \quad 11 \quad 12 \\
&\phantom{=} 17 \quad 20 \quad 23
\end{align*}
\]

What if the Aliens evolved to have 2 hands? (So, 6 fingers total.)
How many numbers come before 32?

- Answer: 20

\[
\begin{align*}
&\phantom{=} 5 \quad 00 \quad 01 \quad 02 \quad 03 \quad 04 \quad 05 \\
&\phantom{=} 16 \quad 17 \quad 18 \quad 19 \quad 20 \quad 21 \quad 22 \\
&\phantom{=} 25 \quad 26 \quad 27 \quad 28 \quad 29 \quad 30 \quad 31 \quad 32
\end{align*}
\]

The whole numbers are all the numbers you get by counting, starting at zero.

Step—going to the next number.

\[
0 \rightarrow 1 \rightarrow 2 \rightarrow 3 \rightarrow 4 \rightarrow 5 \ldots
\]

Marker Example:
2 black and 3 blue How can we add these markers without using the word add or symbol +?

- Answer: Use the counting steps!

\[
\begin{align*}
\text{black markers} & \quad \text{blue markers} \\
0 \rightarrow 1 \rightarrow 2 \rightarrow 3 \rightarrow 4 \rightarrow 5 \quad \text{total!}
\end{align*}
\]

"2 + 3" means the number you arrive at when you start at 2 and count 3 more steps.

In general, if \( m \) and \( n \) are any two whole numbers, we define \( m + n \) to be the number you arrive at by starting at \( m \) and counting \( n \) steps.
The equal sign:

When we write \(4 + 5 = 9\), we mean "4+5" and "9" are the same number.

\[ 1 + 2 + 3 = ?? \]
\[ 1 + 2 = 3 = 3 \Rightarrow \text{Correct answer but false mathematical statement!} \]
\[ 1 + 2 \neq 3 + 3 \]
\[ 3 \neq 6 \]

Assigned HW: Ch. 1 - 1, 3, 4, 9, 10, 13

Due Sept. 4th!

Next Tuesday

**Explain the reasoning behind the answer!!**