

Lab 1: The Natural (Counting) Numbers

Imagine that you are a hunter-gatherer living prior to 20,000 BC. You only have what you can carry because you are constantly on the move in order to eat and to avoid being eaten. You don't accumulate anything, so there is no need to count.

Then, around 20,000 BC, Cro Magnon man starts doing something interesting — making marks on bones and sticks. Here is the earliest known example from Central Africa called the Ishango bone:



The Ishango Bone (circa 20,000 BC)

Man is counting! This counting coincides with the transition from hunter-gatherer to more stationary agricultural societies. What do you think are some of the things that early man is counting?

This is not a trivial thing. Man is not just pointing to sheep and counting them, he is making a connection in his mind between the marks on a stick and the animals in the field.

Today, we do something similar, but instead of marks on a stick, we use numbers. For counting, we use the familiar Hindu-Arabic number system, invented somewhere between the 1st and 4th centuries:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, . . .

We call these the *natural* or *counting* numbers.

Note that the natural numbers start with the number 1. The three dots at the end are called an *ellipsis*. This means that the pattern continues in the same fashion. Where does it stop? If you think about it, given any natural number, you can always add one to it to get another number. So the answer is that it does not stop. You may have heard the phrase, “it goes on until infinity.” Indeed, infinity, denoted by ∞ , is a concept that we will talk about later in the course. The important thing to remember is that ∞ is *not* a number, although it will seem like we treat it

like a number from time to time. Instead, it represents the concept or process of “keep going and don’t stop.” Thus, we *do not* write something like this:

1, 2, 3, 4, 5, \dots , ∞ WRONG!

Questions

- 1). List three things that early man may have been counting.

- 2). Write the first 20 natural numbers followed by an ellipsis.

- 3). Practice writing ∞ five times. Make sure that you make the two lobes equal size.

- 4). Indicate whether or not each of the following is a natural number:
 - a). 5

 - b). 0

 - c). -1

 - d). 1,000,000

 - e). ∞