The Natural numbers or counting numbers begin with 1 and go on forever: \{1, 2, \ldots\}

These numbers follow the rules of arithmetic with certain restrictions:

Perform the following:

\[ 72 + 33 = \quad \quad 57 - 22 = \quad \quad 14 \times 2 = \quad \quad 21/3 = \quad \]

In each of these your answers are in the set of Natural Numbers \{1, 2, \ldots\}

However, note that with subtraction, the first number has to be bigger than the second number because we don't have a natural number that satisfies: \(15 - 20 = \quad \) nor a number that satisfies \(20 - 20 = \quad \).

Way back in time, these were the only numbers we needed. It was only necessary to use numbers as representing quantities of something actually in front of you. Later on, people began to understand the concept of zero. When a hunter comes home empty handed at the end of a long day, he is experiencing the concept of zero in an unpleasant way.

Although early civilizations (Egyptian, Greek, Roman) understood the concept of zero, they had no symbol for it. Their numbering systems simply didn't have a symbol for zero and as such, it was never really used in their day to day mathematics. Even now, when you look at the end of a movie trailer, you'll see the Roman numerals \text{MCMLXXX} for a movie that was made in 1980. Zero was simply not fully understood and was never included in their numbering system.

Whole Numbers

The symbol 0 for zero is believed to have originated in Cambodia and Sumatra around the year 683 and has only been used extensively since the late 1400s when
the Hindu-Arabic system replaced Roman Numerals. With this symbol, we can now work with the set of Whole Numbers \( \{0, 1, 2, \ldots \} \) which is just the set of Natural numbers with the inclusion of 0.

Now, you can perform the following:

\[
17 + 0 = \_
\]

\[
345 - 345 = \_
\]

Note that since 0 isn’t part of the natural numbers, you couldn’t do the second problem above with just natural numbers.

Negative Numbers

Negative numbers do not exist in the writings of ancient Egypt, Babylonia or Greece. Around the year 270 when negative numbers occurred as solutions to equations like

\[
4x + 20 = 0
\]

the Greek mathematicians regarded them as absurd.

It wasn’t until the Renaissance (14\(^{th}\) and 15\(^{th}\) centuries) that people began to accept negative numbers. At that time, negative numbers were used as solutions to equations like \(4x + 20 = 0\) and also as numbers that are less than zero. The word “Positive” was assigned to numbers bigger than zero and “Negative” was assigned to numbers less than zero.

We designate a negative number with a minus “-” sign in front of it. Thus, negative 5 would be written as \(-5\). Positive numbers don’t need a sign in front of it.

Write the following:

\[
\text{Five} = \_
\]

\[
\text{Negative seventeen} = \_
\]

\[
\text{Zero} = \_
\]

Note that all of your answers are either a whole number \( \{0, 1, 2, \ldots \} \) or a negative number \( \{-3, -2, -1\} \)

By combining the negative numbers with the whole numbers, we get the integers:

\[
\{-3, -2, -1\} + \{0, 1, 2, \ldots \} = \{-3, -2, -1, 0, 1, 2, 3, \ldots \}
\]
We can use a number line to illustrate the integers:

To graph an integer, locate its position on the number line and draw a dot. For example, the numbers -3, -1, 0, 2, and 4 are graphed.

Graph the following integers on the number line below: -4, -2, 0, 3, and 4