

The Number Line Number Lines

I - Explore

We can arrange all the [whole numbers](#) on a [number line](#). A number line is a horizontal line that has points, equally spaced, which correspond to each of the whole numbers:



Figure 1.1: Whole Number Line

Each number is greater than all the numbers to its left and less than all the numbers to its right. For example, 5 is greater than 0 and 3, but less than 6 and 8.

Negative Numbers on the Number Line

We have seen that the number line extends to the right from zero. It also extends to the left from zero. However, the set of numbers defined by the term whole numbers includes only [positive numbers](#), those pictured in the number line above. The set of whole numbers does not include negative numbers, which extend to the left from zero on the number line below. This second number line is called an [integer](#) number line, since integers are the set of numbers including all whole numbers and their negative [opposites](#). Two opposite numbers are the same distance from zero on the number line, but on opposite sides. For example, 3 and -3 are opposites. 0 does not have an opposite.

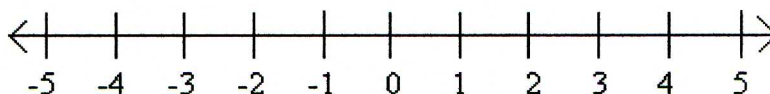


Figure 1.2: Integer Number Line

On the integer number line, each number is still greater than all the numbers to its left and less than all the numbers to its right. Thus, we can see that 2 and 5 are greater than -3 and -3 is greater than -4. All positive numbers are greater than all [negative numbers](#). Plus, if one positive number is greater than another positive number, then its opposite is less than the opposite of the other number. For example, 5 is greater than 3 (5 is to the right of 3), but -5 is less than -3 (-5 is to the left of -3). Two opposites, as you might expect, will cancel each other out; when added together they will equal 0.

Fractions and Decimals on the Number Line

In addition to whole numbers and their opposites, the number line can also include positive and negative [fractions](#) and decimals. These are put between the whole numbers, at intervals that reflect the size of the [fraction](#). For example, $\frac{1}{3}$ is placed one-third of the way between 0 and 1, and 8.75 is placed a distance of 0.75 (three-fourths of the way) between the 8 and the 9. Here is an example of the number line with three fractions included:

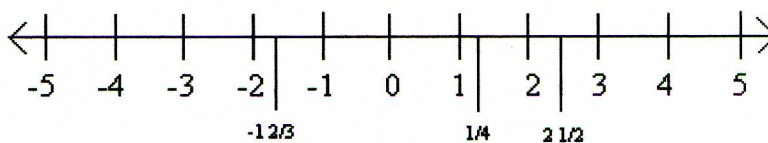


Figure 1.3: Number Line with Fractions