

Module 4: Moving Beyond Positive Quantities

TOPIC 1: SIGNED NUMBERS

In this topic, students are formally introduced to negative numbers. Students begin by reflecting the positive numbers across zero to build the rational number line. They focus on the meaning assigned to positive and negative rational numbers, with particular focus on the meaning of 0 in real-world and mathematical situations. Students develop an understanding of the relationship between opposites and distance on a number line, leading to the concept of absolute value. Throughout this topic, students continue to develop their fluency with whole numbers, fractions, and decimals.

Where have we been?

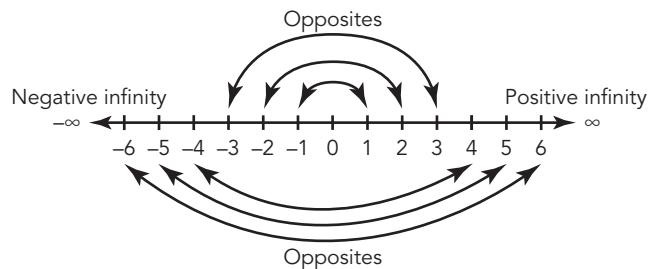
Prior to grade 6, students positioned whole numbers, fractions, and decimals on number lines and operated with these numbers using number lines as references. The opening activities in this topic draw on this prior knowledge of number lines and numbers' positions relative to each other. In previous lessons in this course, students learned about and ordered non-negative rational numbers.

Where are we going?

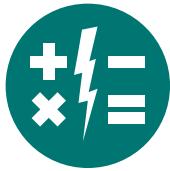
Students will operate on signed numbers beginning in grade 7. The foundation provided in this topic will enable students to develop strategies for operating with signed numbers. Students will continue using the ideas from this topic throughout the remainder of the course. Just as they reflected the number line to include negative values, in the next topic students will reflect the first quadrant of a coordinate plane to create the four-quadrant coordinate plane.

Using a Number Line to Visualize Opposites

Each positive integer has an opposite, negative integer, and vice versa. The negative sign reflects a number across 0 on the number line. For example, the opposite of 3 is -3 . Furthermore, the opposite of an opposite is the original number, e.g., $-(-3) = 3$.



Myth: Cramming for a test is just as good as spaced practice for long-term retention.



Everyone has been there. You have a big test tomorrow, but you've been so busy that you haven't had time to study. So you had to learn it all in one night. You may have received a decent grade on the test. However, did you remember the material a week, month, or a year later?

The honest answer is, "probably not." That's because long-term memory is designed to retain useful information. How does your brain know if a memory is "useful" or not? One way is the frequency in which you encounter a piece of information. If you see something only once (like during cramming), then your brain doesn't deem those memories as important. However, if you sporadically come across the same information over time, then it's probably important. To optimize retention, encourage your student to periodically study the same information over expanding intervals of time.

#mathmythbusted

Talking Points

You can further support your student's learning by resisting the urge, as long as possible, to get to the answer in a problem that your student is working on. Students are encountering negative numbers formally for the first time in this topic. They will need time and space to struggle with all the implications of working with this expanded number system. Practice asking good questions when your student is stuck.

Questions to Ask

- Let's think about this. What are all the things you know?
- What do you need to find out?
- How can you model this problem?

Key Terms

opposites

Opposite numbers are reflections of each other across 0 on the number line.

negative numbers

The values to the left of zero on the number line are called negative numbers and are labeled with a negative sign.

absolute value

The absolute value of a number is its distance from zero on a number line.