Module 2: Operating with Signed Numbers

TOPIC 1: ADDING AND SUBTRACTING RATIONAL NUMBERS

In this topic, students use number lines and two-color counters to model addition and subtraction of integers before developing rules for determining the sum and difference of signed numbers. Students are expected to make connections among the representations used. After they understand what it means to add and subtract integers, students apply the rules to the set of rational numbers.

Where have we been?

In grade 6, students learned how to represent positive and negative rational numbers on a number line. They also know that $-p$ is p units from 0 on the number line and that $|p| = |-p| = p$. Students used number lines to model the distance from 0 and to model the distance between two rational numbers represented on vertical or horizontal number lines.

Where are we going?

Students will develop a strong conceptual foundation for adding and subtracting with rational numbers to provide the foundation for manipulating and representing increasingly complex numeric and algebraic expressions in later lessons and future courses and grades.

Using a Number Line to Model Adding and Subtracting Integers

A number line can be used to model adding and subtracting negative numbers. This number line models the sum $5 + (-8)$.
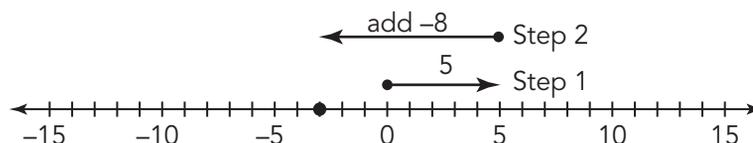
Myth: Students only use 10% of their brains.
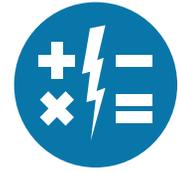
Hollywood is in love with the idea that humans only use a small portion of their brains. This notion formed the basis of the movies *Lucy* (2014) and *Limitless* (2011). Both films ask the audience: Imagine what you could accomplish if you could use 100% of your brain!

Well, this isn't Hollywood, and you're stuck with an ordinary brain. The good news is that you **do** use 100% of your brain. As you look around the room, your visual cortex is busy assembling images; your motor cortex is busy moving your neck; and all of the associative areas recognize the objects that you see. Meanwhile, the corpus callosum, which is a thick band of neurons that connect the two hemispheres, ensures that all of this information is kept coordinated. Moreover, the brain does this automatically, which frees up space to ponder deep, abstract concepts...like mathematics!

#mathmythbusted

Talking Points

You can further support your student's learning by asking questions about the work they do in class or at home. Your student is learning to reason using signed numbers.

Questions to Ask

• How does this problem look like something you did in class?
• Can you show me the strategy you used to solve this problem? Do you know another way to solve it?
• Does your answer make sense? How do you know?
• Is there anything you don't understand? How can you use today's lesson to help?

Key Terms

absolute value
The absolute value of a number is its distance from 0 on a number line.

additive inverse
The additive inverse of a number is the opposite of the number: $-x$ is the additive inverse of x. Two numbers with the sum of zero are called additive inverses.

zero pair
A zero pair is a pair of numbers whose sum is zero. The value of negative 1 plus positive 1 is zero. So, negative 1 and positive 1 together are a zero pair.