



Topic A:

Addition and Subtraction of Integers and Rational Numbers

7.NS.A.1

Focus Standard:	7.NS.A.1	<p>Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.</p> <ol style="list-style-type: none"> Describe situations in which opposite quantities combine to make 0. <i>For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.</i> Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. Apply properties of operations as strategies to add and subtract rational numbers.
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Instructional Days: 9

- Lesson 1:** Opposite Quantities Combine to Make Zero (P)¹
- Lesson 2:** Using the Number Line to Model the Addition of Integers (P)
- Lesson 3:** Understanding Addition of Integers (P)
- Lesson 4:** Efficiently Adding Integers and Other Rational Numbers (P)
- Lesson 5:** Understanding Subtraction of Integers and Other Rational Numbers (S)
- Lesson 6:** The Distance Between Two Rational Numbers (S)

¹ Lesson Structure Key: **P**-Problem Set Lesson, **M**-Modeling Cycle Lesson, **E**-Exploration Lesson, **S**-Socratic Lesson

Lesson 7: Addition and Subtraction of Rational Numbers (P)**Lessons 8–9:** Applying the Properties of Operations to Add and Subtract Rational Numbers (P)

In Topic A, students find sums and differences of signed numbers and establish rules related to the addition and subtraction of rational numbers (**7.NS.A.1**). Students draw upon experiences in modeling, ordering, and comparing integers and other rational numbers from Grade 6, Module 3 (**6.NS.C.5**, **6.NS.C.6**, **6.NS.C.7**). They use their previous work with adding and subtracting fractions and decimals (**5.NF.A.1**, **6.NS.B.3**) to compute the sums and differences of rational numbers. In Lesson 1, students play a card game called the Integer Game to understand how a number and its opposite combine to make zero. The number line is used to count up and down, serving as a visual model for finding sums. In Lessons 2 and 3, students more formally develop their understanding of the addition of integers. They use vectors to represent integers on the number line and apply the concept of absolute value (**6.NS.C.7c**) to represent the length of the vector while interpreting the sign of the integer as the vector's direction. By Lesson 4, students are efficiently adding integers using well-defined rules.

After addition rules are formalized, students begin subtracting integers in Lesson 5. They relate subtraction to removing a card from their hand in the Integer Game, realizing that subtracting a positive card has the same effect as adding or picking up a negative card. Similarly, removing (subtracting) a negative card increases students' scores the same way as adding the corresponding positive card. Therefore, students determine that subtracting a signed number is the same as adding its opposite. In Lesson 6, students deepen their understanding of subtraction using absolute value and the number line to justify that the distance between two signed numbers is the absolute value of their difference. They represent sums and differences of rational numbers using the number line in Lesson 7 and use vectors to model the sum, $p + q$, or the difference, $p - q$. As Topic A concludes, students apply the properties of operations to add and subtract rational numbers in Lessons 8 and 9. Using the properties of operations and their fluency in adding and subtracting decimals and fractions from earlier grades, they rewrite numerical expressions in different forms to efficiently find sums and differences of signed numbers without the use of a calculator.

Mid-Module Assessment questions 1, 2, 4, and 6 may be administered at the conclusion of Topic A to serve as an intermediate assessment before students are introduced to Topic B.