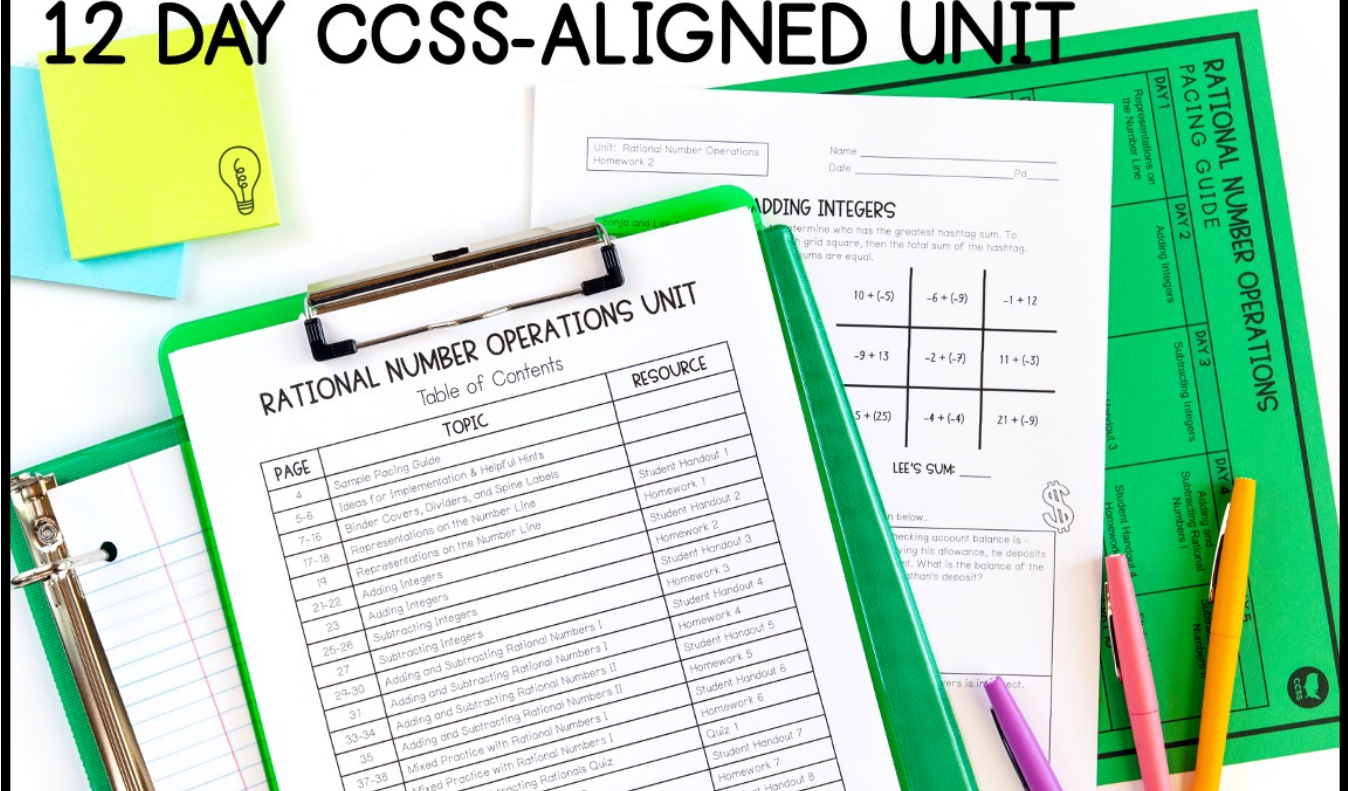


learning focus:

- ✓ represent rational numbers on a number line & write situations that combine to make zero
- ✓ classify rational numbers
- ✓ add, subtract, multiply, and divide rational numbers in real-world situations

RATIONAL NUMBER OPERATIONS UNIT

12 DAY CCSS-ALIGNED UNIT



A MANEUVERING THE MIDDLE® RESOURCE

RATIONAL NUMBER OPERATIONS



a 12 day CCSS-aligned unit

CCSS: 7.NS.1, 7.NS.1A-D, 7.NS.2, 7.NS.2A-D, 7.NS.3

ready-to-go, scaffolded
student materials

RATIONAL NUMBER OPERATIONS UNIT

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RATIONAL NUMBER OPERATIONS



a 12 day CCSS-aligned unit

CCSS: 7.NS.1, 7.NS.1A-D, 7.NS.2, 7.NS.2A-D, 7.NS.3

student friendly + real-world application

use of grade level modeling

Unit: Rational Number Operations
Student Handout 2

Name _____
Date _____ Pd _____

ADDING INTEGERS

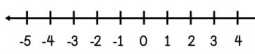
MODELING WITH A NUMBER LINE

DISTANCE → DISTANCE
DIRECTION →

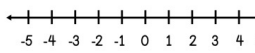
$-3 + 8$

Use the number line to model and solve the problem.

1. $-1 + 4 =$



3. $-1 + (-4) =$



5. Explain any additional patterns that you notice.

ADDING INTEGERS

- If the two values have the same sign,
 - positive + positive = positive
 - negative + negative = negative
- If the signs are different,
 - subtract the smaller absolute value from the larger absolute value.
 - the sign of the number with the larger absolute value is the sign of the sum.

Ex: $6 + (-5) = 1$

Practice adding integers. Then, find the sum of each column, checking your answer with the provided sum.

A	B	C	D
$-9 + 6 =$	$7 + (-3) =$	$-11 + 5 =$	$-6 + (-8) =$
$4 + 7 =$	$1 + (-9) =$	$-5 + (-9) =$	$3 + 9 =$
$-7 + 12 =$	$2 + (-6) =$		
SUM: 13	SUM:		

As you apply integer operations to real-world situations, use the questions to guide your thinking and discussion.

What value are you thinking of?

6. A submarine is traveling 200 feet below sea level. It then ascends 75 feet. What is its new position? Write an equation to represent the situation.

8. Three friends are playing a card game. The player with the largest sum goes first. Which player wins?

DEENA
6, -9, 7, -5

Summarize today's lesson:

Unit: Rational Number Operations
Homework 2

Name _____
Date _____ Pd _____

ADDING INTEGERS

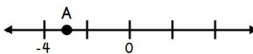
1. Sonja and Lee are playing a game to determine who has the greatest hashtag sum. To determine the winner, find the sum of each grid square, then the total sum of the hashtag. Circle the winning sum or write "tie" if the sums are equal.

$8 + 9$	$-6 + 7$	$3 + 10$	$10 + (-5)$	$-6 + (-9)$	$-1 + 12$
$10 + (-6)$	$11 + (-3)$	$-7 + 5$	$-9 + 13$	$-2 + (-7)$	$11 + (-3)$
$-3 + (-9)$	$-1 + 8$	$-4 + (-4)$	$-5 + (25)$	$-4 + (-4)$	$21 + (-9)$

SONJA'S SUM: _____ LEE'S SUM: _____

Use your understanding of adding integers to answer the question below.

2. The number line with point A is shown below. What are the values of the expressions below?



a. $A + 1$: _____
b. $A + 6$: _____

3. Jonathan's checking account balance is -\$45. After receiving his allowance, he deposits \$7 into his account. What is the balance of Jonathan's account after his deposit?

4. Marcella solved three different questions on a math quiz. One of the answers is incorrect. Determine which solution is incorrect and explain your reasoning.

QUESTION #1 $-11 + (-7) = -4$	QUESTION #2 $29 + (-18) = 11$	QUESTION #3 $-16 + 35 = 19$
----------------------------------	----------------------------------	--------------------------------

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error analysis

RATIONAL NUMBER OPERATIONS



a 12 day CCSS-aligned unit

CCSS: 7.NS.1, 7.NS.1A-D, 7.NS.2, 7.NS.2A-D, 7.NS.3

streamline your planning process with unit overviews

- ✓ key vocabulary
- ✓ vertical alignment



sample
pacing
calendar

RATIONAL NUMBER OPERATIONS OVERVIEW

STANDARDS

7.NS.1 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.

7.NS.1A Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.

7.NS.1B 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.

7.NS.1C 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.

7.NS.1D Apply properties of operations as strategies to add and subtract rational numbers.

7.NS.2 Apply and extend previous understandings of multiplication and division of fractions to multiply and divide rational numbers.

7.NS.2A Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.

7.NS.2B Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisors) is a rational number.

7.NS.2C Apply properties of operations as strategies to multiply and divide rational numbers.

7.NS.2D Convert a rational number to a decimal; understand that the decimal form of a rational number terminates in 0s or repeats in a repeating pattern.

7.NS.3 Solve real-world and math problems involving rational numbers in all four operations.

BIG IDEAS

- All numbers are organized by their location on the number line.
- Rational numbers can be used to describe real-world situations.

ESSENTIAL QUESTIONS

- What is the relationship between addition and subtraction?
- What pattern do you notice in the results of adding and subtracting rational numbers?
- How do I know which operation to use?

RATIONAL NUMBER OPERATIONS PACING GUIDE

DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
Representations on the Number Line Student Handout 1 Homework 1	Adding Integers Student Handout 2 Homework 2	Subtracting Integers Student Handout 3	Adding and Subtracting Rational Numbers I Student Handout 4	Adding and Subtracting Rational Numbers II Student Handout 5
DAY 6	DAY 7			
Mixed Practice with Rational Numbers I Student Handout 6 Homework 6	Adding and Subtracting Rational Numbers Quiz Quiz 1			
DAY 11	DAY 12			
Rational Number Operations Unit Study Guide Unit Study Guide	Rational Number Operations Unit Test Unit Test			

RATIONAL NUMBER OPERATIONS OVERVIEW

TOPIC	TEACHING TIPS
The Number System	<ul style="list-style-type: none"> Consider introducing both a horizontal and a vertical number line. Seeing the vertical number line (which is more intuitive to how we count) next to a horizontal vertical line may help students to make connections and provides another visual model.
Integer Operations	<ul style="list-style-type: none"> Modeling addition of integers can be a hands-on experience. If your school does not have counters, then consider using white and black beans or colored pieces of cardstock. I would suggest a clear bag with 15 positive and 15 negative counters per student. Students seem to be able to conceptually understand money in a bank account and can then make a better connection to integers. Consider using a vertical number line if students struggle. Sometimes, that changes the perception of what is happening, especially with real life problems. A large number line where students have to "walk out" the problem can also provide fun reinforcement and practice.
Adding Rational Numbers	<ul style="list-style-type: none"> This concept requires quite a bit of practice, so consider some fun ways to spice up the problems. For example, use small whiteboards, have students create a "cootie catcher" with various rational numbers, and then have them complete the problem. Note: Be sure to address how the questions are asked & how that impacts if the solution is negative or positive.

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teaching
ideas



RATIONAL NUMBER OPERATIONS



a 12 day CCSS-aligned unit

CCSS: 7.NS.1, 7.NS.1A-D, 7.NS.2, 7.NS.2A-D, 7.NS.3

unit study guide + assessments

✓ quizzes

✓ editable unit test

Unit: Rational Number Operations
Quiz 1

Name _____
Date _____ Pd _____

QUIZ: ADDING AND SUBTRACTING RATIONALS

Use the table to answer questions 1-4.

ACCOUNT	BALANCE
A	\$56.84
B	-\$19.00

1. What is the total amount of the negative balances?

2. What is the total amount of the positive balances?

3. How much more money is in account A than in account B?

A. \$64.36 B. \$36.86

4. If accounts B and A are combined, how much money do they have in total?

A. \$37.84 B. \$75.84

Solve the problems below. Be sure to show your work.

5. $-20 + (-14) =$ 6. $19 + (-11) =$

Unit: Rational Number Operations
Review

Name _____
Date _____ Pd _____

RATIONAL NUMBER OPERATIONS UNIT STUDY GUIDE

Solve each of the problems below. These represent the types of questions on your test. Be sure to ask questions if you need more help with a topic.

I CAN REPRESENT NUMBERS ON A NUMBER LINE.

1. Use the number line below to plot points A and B.

A: -2 B: 1

2. Use the number line below to show the additive inverse of 3.

I CAN WRITE SITUATIONS THAT COULD BE REPRESENTED BY A RATIONAL NUMBER.

4. Write a real-world example so that the rational number makes sense.

a. The temperature during a winter storm is -15 degrees Fahrenheit.

b. The water level rises to 7 feet above sea level.

I CAN SOLVE PROBLEMS.

5. Create an equivalent expression using the distributive property.

$-11(2 + 3) =$

SEVENTH GRADE CURRICULUM

RATIONAL NUMBER OPERATIONS

UNIT ONE: ANSWER KEYS

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answer keys included