MODULE 3, TOPIC 1 ASSESSMENT SCORING GUIDE

1 Operating with Rational Numbers

Numbers and Operations

1 DAY PACING = 45-MINUTE SESSION

The student is expected to:

7.2A extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of rational numbers.

7.3A add, subtract, multiply, and divide rational numbers fluently.

7.3B apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers.

Question Number	TEKS*	Point Value	Scoring Guidance
1	7.3A	1	• The student selects the correct answer (1 point) • The student does not select the correct answer (0 points)
2	7.2A	1	• The student selects the correct answer (1 point) • The student does not select the correct answer (0 points)
3	7.2A	2	• The student identifies all of the correct sections. (2 points) • The student identifies some of the correct sections. (1 point) • The student does not identify any of the correct sections (0 points)
4	7.3A	1	• The student determines the correct value. (1 point) • The student does not determine the correct value. (0 points)
5	7.3A	1	• The student determines the correct product. (1 point) • The student does not determine the correct product. (0 points)
6	7.3A	2	• The student determines the correct number of slices and the correct number of inches left over. (2 points) • The student determines the correct number of slices or the correct number of inches left over. (1 point) • The student does not determine the correct number of slices, nor the correct number of inches left over. (0 points)
7	**7.3B**	2	• The student determines the correct cost and gives a logical explanation. (2 points) • The student determines the correct cost or gives a logical explanation. (1 point) • The student does not determine the correct cost nor gives a logical explanation. (0 points)
8	**7.3B**	1	• The student determines the correct distance. (1 point) • The student does not determine the correct distance. (0 points)
9	**7.3B**	1	• The student determines the correct amount. (1 point) • The student does not determine the correct amount. (0 points)
10	**7.3B**	1	• The student selects the correct answer (1 point) • The student does not select the correct answer (0 points)
11	7.3A	1	• The student determines the correct value. (1 point) • The student does not determine the correct value. (0 points)

*Bold TEKS = Readiness Standard

Response to Student Performance

TEKS*	Question(s)	Recommendations
7.2A	2, 3	**To support students:** • Review the definitions of integer, natural, rational, and whole numbers.. • Use Skills Practice Set I.A for additional practice.
7.3A	4, 5, 6	**To support students:** • Use Skills Practice Sets II.A and II.B for additional practice. • Review Lesson 2 Talk the Talk. **To challenge students:** • Extend student knowledge with Skills Practice Extension Set II.
	1	**To support students:** • Use Skills Practice Set III.A for additional practice. • Review Lesson 3 Assignment Practice Question 4.
	11	**To support students:** • Use Skills Practice Set IV.B for additional practice. • Review Lesson 4 Assignment Practice Questions 5 and 6.
7.3B	7, 8, 9, 10	**To support students:** • Use Skills Practice Set III.A for additional practice. • Review Lesson 3 Assignment Practice Questions 1–3.

NOTE: Both teachers and administrators should refer to the Assessment Guidance and Analysis section of the Course and Implementation Guide for additional support in analyzing and responding to student data.

*Bold TEKS = Readiness Standard

Name _____ Date _____

7.3A (S) 1pt

1. Andrew is putting mulch in a playground area that he built in his yard. He already has $4\frac{1}{4}$ bags of mulch to use. Each bag of mulch covers 90.7 square feet. How many square feet will Andrew be able to cover if he uses all of this mulch?

★ **A.** 385.475 ft²

B. 408.15 ft²

C. 362.8 ft²

D. 360.175 ft²

90.7 · 4.25 = 385.475

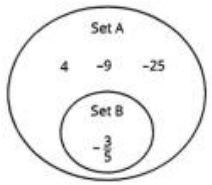
SPS III A
L3 APQ 4
XYX STAAR

7.2A (S) 1pt

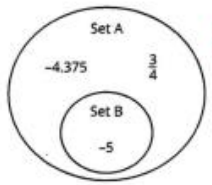
2. Set A represents rational numbers. Set B represents integers. Which diagram shows the numbers placed in the correct sets?

XXX STAAR
SPS I A

F.



★ **G.**



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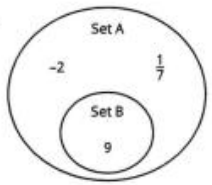
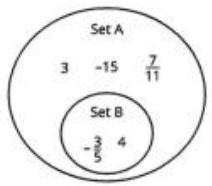


J.



−4.375 is a decimal and $\frac{3}{4}$ is a fraction. Decimals and fractions are rational numbers that are not integers. −5 is an integer.

Notes

7.3A (S)
Dec w/ Frac - IIII
Dec w/ FRAC WORD - II
Dec w/ whole # - II

7.2A (S)
CWDITR - MM with Drag

7.3B (R)
Mult Frac w/ whole (word p) - III
Add/Subt Frac word p
Subt/Mult Dec word p - I

SPS - Skill practice Set
LAPQ - Lesson Assn. practice Question
SpEs - Skill practice Extension set

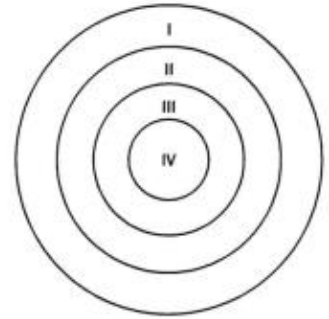
YY STAAR

Notes

7.2A (S) 2pts

3. The Venn Diagram represents the relationship between integers, natural numbers, rational numbers, and whole numbers.

SPS I A



Which number set is best represented by each section label in the diagram? Select the correct answer in each row.

Number Set	Section I	Section II	Section III	Section IV
Integers		X		
Natural Numbers				X
Rational Numbers	X			
Whole Numbers			X	

Notes

7.3A (S) 1pt

4. Determine the value of the expression. $-3\frac{4}{5} \div -3\frac{1}{6}$

$1\frac{1}{5}$

SPS II A, B

SPES II

* STAAR

5. Determine the value of the expression. $-6.2\left(2\frac{3}{4}\right)$

$-17\frac{1}{20}$ or -17.05

SPS II A

SPES II

* STAAR

7.3A (S) 1pt

6. Alyssa needs to cut a 12-inch loaf of bread into slices that are $\frac{5}{6}$ inch thick.

* STAAR

SPS II A

SPES II

7.3A (S) 2pts

a. How many $\frac{5}{6}$-inch thick slices can Alyssa cut from the 12-inch loaf of bread?

$12 \div \frac{5}{6} = 12 \cdot \frac{6}{5} = \frac{72}{5} = 14\frac{2}{5}$

There are 14 full slices that can be cut from the 12-inch loaf of bread, and $\frac{2}{5}$ of a $\frac{5}{6}$-inch slice would be left over.

b. How many inches of bread would be left over?

$\frac{2}{5} \cdot \frac{5}{6} = \frac{2}{6} = \frac{1}{3}$

There would be $\frac{1}{3}$ inch of bread left over.

7.3B (R) 2pts

* STAAR

7. Natalia gave the store clerk $40.00 to pay for 2 pairs of leggings. The store clerk gave her $7.12 in change. Each pair of leggings costs the same amount. What is the cost in dollars and cents for each pair of leggings? Explain your reasoning.

$16.44

The cost of 2 pairs of leggings is the amount Natalia gives the clerk minus her change. $40 - 7.12 = 32.88$. The cost of the 2 pairs divided by 2 gives the cost of 1 pair. $32.88 \div 2 = 16.44$.

SPS III A

L3 APQ 1-3

7.3B (R) 1pt

* * * STAAR

8. Kaya biked a distance of $6\frac{1}{2}$ miles each day for 3 days. Then, she biked $7\frac{1}{4}$ miles each day for the next 5 days. What was the total distance in miles that Kaya biked during these 8 days?

$55\frac{3}{4}$ mi

$6\frac{1}{2} \cdot 3 = 19\frac{1}{2}$

$7\frac{1}{4} \cdot 5 = 36\frac{1}{4}$

$19\frac{1}{2} + 36\frac{1}{4} = 55\frac{3}{4}$

SPS III A

L3 APQ 1-3

7.3B (R) 1pt

* STAAR

9. Samantha uses a cafeteria account to pay for meals at school. She got a notice saying she owed the school $7.82. The next day, she gave the school a check to add $15.75 to her account and spent $2.25 on lunch. How much money in dollars and cents does Samantha now have in her cafeteria account?

$5.68

$-7.82 + 15.75 - 2.25 = 5.68$

SPS III A

L3 APQ 1-3

Notes

10. Alejandro has 180 pumpkins to sell.

7.3B (R) 1pt

- $\frac{1}{4}$ of the pumpkins are lumina pumpkins.
- $\frac{1}{6}$ of the pumpkins are jack o'little pumpkins.
- $\frac{1}{10}$ of the pumpkins are sugar pie pumpkins.
- The rest of the pumpkins are cotton candy pumpkins.

SPS III A
L3 APQ 1-3
~~★~~ ~~★~~ ✓ STAAR

How many pumpkins are cotton candy pumpkins?

A. 30 Lumina: $\frac{1}{4} \cdot 180 = 45$

B. 45 Jack o'Little: $\frac{1}{6} \cdot 180 = 30$

★ **C.** 87 Sugar Pie: $\frac{1}{10} \cdot 180 = 18$

D. 90 Cotton Candy: $180 - (45 + 30 + 18) = 180 - 93 = 87$

11. What is the value of the expression $-4\frac{1}{4} - \left(-5\frac{3}{8}\right)$?

7.3A (S) 1pt

$1\frac{1}{8}$

✓ STAAR.

SPS IV B
L4 APQ 1-3

MODULE 3 OVERVIEW

TEKS* Addressed:
7.2A, 7.3A, **7.3B**, **7.4A**, **7.4D**, **7.7A**, 7.10A, 7.10B, 7.10C, **7.11A**, 7.11B

*Bold TEKS = Readiness Standard

Reasoning Algebraically

Sessions: **41** patterns & sense making with expressions & eqs.

Why is this module named *Reasoning Algebraically*?

Reasoning Algebraically continues to build students' facility with formal algebra. Students need to view algebra in terms of patterns and sense-making, not as a set of procedures and rules to follow. Therefore, the primary focus of this module is making sense of and reasoning about expressions and equations. The expressions, equations, and inequalities students encounter in this module are more complex than those studied previously, involving a wide range of rational numbers and requiring two steps rather than one.

Throughout the module, students are expected to reason about quantities, interpret quantities in equations and inequalities, and reason about the connections across representations of equations and inequalities. Although students should also build procedural fluency in operating with expressions, equations, and inequalities with positive and negative rational coefficients and values, reasoning about the algebraic relationships should remain at the forefront. alg relationships are crucial

The Research Shows . . .

"Effective algebraic thinking sometimes involves reversibility (i.e., being able to undo mathematical processes as well as do them). In effect, it is the capacity not only to use a process to get to a goal, but also to understand the process well enough to work backward from the answer to the starting point."

(*Fostering Algebraic Thinking: A Guide for Teachers Grades 6–10*, pp. 1–2)

What is the mathematics of *Reasoning Algebraically*?

Reasoning Algebraically contains three topics: *Operating with Rational Numbers*, *Two-Step Equations and Inequalities*, and *Multiple Representations of Equations*. Students operate with rational numbers. They equate expressions, solve for unknowns in equations and inequalities, and use graphs and tables to analyze relationships.

3 topics in module 3

1 DAY PACING = 45-MINUTE SESSION

possible Learning Objs

17 SESSIONS
16 LEARNING • 1 ASSESSMENT

TOPIC 1 *Operating with Rational Numbers*

Learning Together: 11 Sessions

TEKS: 7.2A, 7.3A, **7.3B, 7.4D**

Students develop fluency with fraction and decimal operations, along with integer operations, to solve problems involving adding, subtracting, multiplying, and dividing with the full set of rational numbers.

- Students learn that rational numbers are the quotients of integers, with the divisor not equal to 0.
- Students revisit number properties as ways to decompose and compose numbers to ease calculations.
- Students use properties of operations to generate equivalent expressions and solve real-world and mathematical problems using numeric and algebraic expressions.
- Students apply the distributive property to expand and factor linear expressions with rational coefficients and as a strategy to combine like terms.

Learning Individually: 5 Sessions

Targeted Skills Practice for *Operating with Rational Numbers*

possible learning objs

- Students add and subtract rational numbers.
- Students solve real-world problems involving operations with rational numbers.
- Students determine quotients of rational numbers.
- Students evaluate expressions for a given value.
- Students use number properties to interpret expressions with signed numbers.
- Students rewrite expressions using the distributive property.

13 SESSIONS
12 LEARNING • 1 ASSESSMENT

TOPIC 2 *Two-Step Equations and Inequalities*

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Learning Together: 9 Sessions

TEKS: 7.10A, 7.10B, 7.10C, **7.11A**, 7.11B

Students use bar models to decompose problem situations and algebra tiles and double number lines to reason about solving two-step equations.

- Students reason through solutions and solution sets for equations and inequalities using models.
- Students use inverse operations to solve two-step equations and inequalities and represent solution sets on number lines.
- Students write a corresponding real-world problem situation that can be represented by a given two-step equation or inequality.

Learning Individually: 3 Sessions

Targeted Skills Practice for *Two-Step Equations and Inequalities*

Learn objs

- Students model equations and inequalities using algebra tiles.
- Students solve two-step linear equations and inequalities.
- Students write and solve linear equations and inequalities for real-world problems.

11 SESSIONS
10 LEARNING • 1 ASSESSMENT

TOPIC 3 *Multiple Representations of Equations*

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Learning Together: 7 Sessions

TEKS: **7.4A**, **7.7A**, 7.10A, **7.11A**

Students analyze relationships between variables on a coordinate plane.

- Students engage in problem solving, writing equations and inequalities for problem situations, interpreting the meanings of quantities in the problems, creating tables of values, graphing problem situations, and making connections across the representations.
- Students solve word problems beginning with a table, graph, equation, or verbal description of the problem.

Learning Individually: 3 Sessions

Targeted Skills Practice for *Multiple Representations of Equations*

- Students identify independent and dependent variables and write equations to represent problems.
- Students create tables, graphs, and equations to represent problem situations.
- Students analyze graphs to estimate solutions and write inequalities to represent scenarios.
- Students use multiple representations to solve problems.

How is *Reasoning Algebraically* connected to prior learning?

- Eval. & write EQ expressions
- write & solve 1step EQs
- Graph EQs

Reasoning Algebraically builds on students' experience with evaluating and writing equivalent expressions, writing and solving one-step equations, and graphing inequalities as constraints in a problem situation. They will use their knowledge of equivalent expressions, inverse operations, and graphing equations on a four-quadrant graph and apply these ideas using the set of rational numbers to model two-step equations and inequalities.

Repres #1

Math Representation

A store makes a 20% profit on the total price of all the items it sells.
Let t represent the total price of all items sold in dollars, and let p represent the profit in dollars.
You can represent this situation in two different ways.

Total Price and Profit

The ___profit___ depends on the ___total price of the items___.

Equation: $p = 0.2t$

Profit and Total Price

The ___total price of the items___ depends on the ___profit___.

Equation: $t = \frac{p}{0.2}$

When will students use knowledge from *Reasoning Algebraically* in future learning?

This module strengthens students' reasoning and fluency in solving equations. In future courses, students analyze and solve systems of linear equations, which involve equations with variables on both sides and rational coefficients.

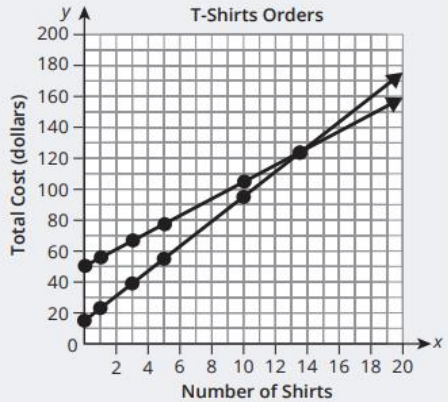
Future Learning

Repres #2

Math Representation

Suppose you are comparing the prices of custom T-shirts sold at two different shops.

Let C represent the total cost in dollars and s represent the number of shirts ordered.



U.S. Shirts charges $8 per shirt plus a one-time charge of $15 to set up a T-shirt design. An equation that models this situation is $C = 8s + 15$.

Cool Shirts charges $5.50 per shirt plus a one-time charge of $49.95 to set up a T-shirt design. An equation that models this situation is $C = 5.50s + 49.95$.

The total costs are about the same when a customer orders 14 shirts. For T-Shirt orders of less than 14, you should buy from U.S. Shirts. For T-shirt orders greater than 14, you should buy from Cool Shirts.

Using a double number line provides the underpinnings for geometric and algebraic transformations of objects and equations. In Grade 8 and Geometry, students will transform geometric objects and conjecture about the effects on the coordinates of the figures geometric figures. They will also transform linear functions, recognizing that the graph of $y = mx + b$ is a translation of $y = x$.

3 Reasoning Algebraically

MODULE 3 Assessment Summary

Topic	Topic Title	Name	Administered	TEKS*
1	Operating with Rational Numbers	End of Topic Assessment	After Topic 1	7.2A 7.3A **7.3B**
2	Two-Step Equations and Inequalities	End of Topic Assessment	After Topic 2	7.10A 7.10B 7.10C **7.11A** 7.11B
3	Multiple Representations of Equations	End of Topic Assessment	After Topic 3	**7.4A** **7.7A** 7.10A **7.11A** 7.10C

*Bold TEKS = Readiness Standard

MODULE 3, TOPIC 1 PACING GUIDE

150-Day Pacing

1 DAY PACING = 45-MINUTE SESSION

✪ *This activity highlights a key term or concept that is essential to the learning goals of the lesson.*

Day 1	Day 2	Day 3	Day 4	Day 5
TEKS: 7.2A, 7.3A, **7.3B**		TEKS: 7.3A, **7.3B**		
LESSON 1 Adding and Subtracting Rational Numbers GETTING STARTED ✪ ACTIVITY 1 ✪ ACTIVITY 2 ✪ ACTIVITY 3 TALK THE TALK	**LEARNING INDIVIDUALLY** Skills Practice *This is a suggested placement. Move based on student data and individual needs.*	**LESSON 2** Quotients of Integers GETTING STARTED ✪ ACTIVITY 1 ✪	**LESSON 2** continued ACTIVITY 2 ✪ TALK THE TALK ✪	**LEARNING INDIVIDUALLY** Skills Practice *This is a suggested placement. Move based on student data and individual needs.*
Day 6	**Day 7**	**Day 8**	**Day 9**	**Day 10**
TEKS: 7.3A, **7.3B, 7.4D**		TEKS: 7.3A, **7.3B**		
LESSON 3 Simplifying Expressions to Solve Problems GETTING STARTED ACTIVITY 1 ✪ ACTIVITY 2 ACTIVITY 3 ✪ TALK THE TALK ✪	**LEARNING INDIVIDUALLY** Skills Practice *This is a suggested placement. Move based on student data and individual needs.*	**LESSON 4** Using Number Properties to Interpret Expressions with Signed Numbers GETTING STARTED ACTIVITY 1 ✪	**LESSON 4** continued ACTIVITY 2 ✪ ACTIVITY 3 TALK THE TALK ✪	**LEARNING INDIVIDUALLY** Skills Practice *This is a suggested placement. Move based on student data and individual needs.*
Day 11				
END OF TOPIC ASSESSMENT				

*Bold TEKS = Readiness Standard

TOPIC 1 OVERVIEW

Operating with Rational Numbers

How are the key concepts of *Operating with Rational Numbers* organized?

In *Operating with Rational Numbers*, the focus is on building fluency when operating with positive and negative rational numbers. Students begin this topic by applying their knowledge of adding and subtracting positive and negative integers to the set of rational numbers. Next, students divide integers, resulting in rational numbers, given the divisor is not 0. They learn that the decimal form of quotients of integers — i.e., rational numbers — always repeat or terminate. Students recognize that the placement of the negative sign on a rational number does not matter $\left(\text{e.g., } -\frac{p}{q} = \frac{-p}{q} = \frac{p}{-q}\right)$.

Students then apply the rules for multiplying and dividing integers to the set of rational numbers. Finally, students apply familiar properties (additive inverse, distributive property, etc.) to rational numbers. They practice expanding and factoring expressions involving −1 and recognize subtraction as applying the additive inverse.

Students represent variable expressions on a number line and making connections between variable and numeric expressions. They use their previous knowledge of evaluating expressions to verify their reasoning. Students then apply the distributive property as a strategy to write equivalent expressions and factor linear expressions in a variety of ways.

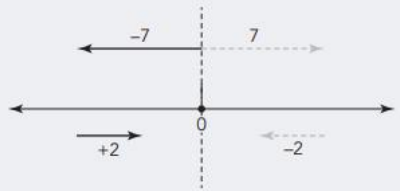
Math Representation

Consider the expression −7 + 2.

When you reflect the model of −7 + 2 across 0 on the number line, the result is 7 − 2.

So, (−7 + 2) is the opposite of (7 − 2).

This means that −7 + 2 = −(7 − 2).



What is the entry point for students?

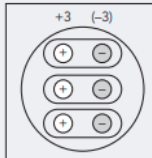
In previous courses, students represented integer operations with concrete models and connected the actions with the models to standardized algorithms. Then, they worked on building fluency in using all four operations with integers. In this course, they will build off of the foundation developed around operating with positive rational numbers and operating with integers, to now building fluency in operating with the full set of rational numbers.

This topic combines students' knowledge of expressions and negative numbers on a number line to develop number line models for variable expressions.

Math Representation

You can model the addition of integers using two-color counters that represent positive (+) charges and negative (−) charges.

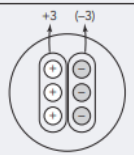
The expression 3 + (−3) can be modeled in different ways



Each positive charge is paired with a negative charge.

Each pair of positive and negative charges has no charge.

3 + (−3) = 0



Three positive charges and three negative charges have no charge.

3 + (−3) = 0

Why is *Operating with Rational Numbers* important?

Rational numbers are the primary set of numbers with which students will work in their educational and non-educational lives. It is essential that students develop a strong conceptual foundation for operating with rational numbers to provide the foundation for manipulating and representing increasingly complex numeric and algebraic expressions. In future courses, students will focus more on expressions and equations than on numbers, including rational expressions, equations, and functions. The work in this topic supports students as they develop automaticity in operating with rational numbers which is a key skill for engaging with more complex mathematical content.

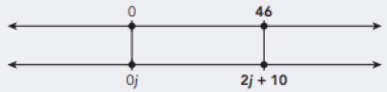
Visualizing simple variable expressions on a number line will carry through the entire topic to help students develop a concrete idea relating expressions to each other and operating with algebraic expressions. In this course, students will extend previous understanding around operating with positive rational numbers and integers to now build fluency in operating with the full set of rational numbers.

Repres #3

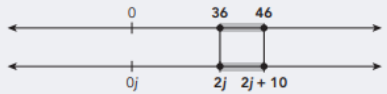
Math Representation

You can use double number lines to help you solve equations. When solving an equation, equality must be maintained. What is done to one expression must be done to the equivalent expression to maintain equality.

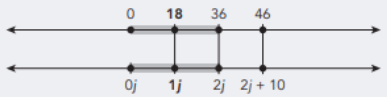
For example, solve the equation $2j + 10 = 46$. First, draw a model to set up the equation.



Next, start decomposing the variable expression. Place $2j$ in relationship to $2j + 10$. The expression $2j$ is 10 to the left of $2j + 10$. To maintain equality, place a number 10 to the left of 46. So, $2j = 36$.



The expression $1j$, or j, is halfway between $0j$ and $2j$, and 18 is halfway between 0 and 36. So, $j = 18$.



How does a student demonstrate understanding?

Students will demonstrate understanding of the standards in this topic when they can:

- Explain why the quotient of two integers, except when the divisor is 0, is always a rational number.
- Apply properties of operations to calculate numbers in any form and convert between numeric forms when necessary.
- Solve multi-step real-world and mathematical problems with numbers in any form (whole numbers, fractions, and decimals), using tools strategically.
- Solve real-world problems by adding, subtracting, multiplying, and dividing rational numbers.
- Use properties of operations to add, subtract, multiply, and divide rational numbers.

NEW KEY TERMS

Key Terms & Cognates

- percent error [error porcentual]
- variable [variable]
- algebraic expression [expresión algebraica]
- linear expression [expresión lineal]
- constraint
- evaluate an algebraic expression [evaluar una expresión algebraica]
- factor [factor]
- coefficient [coeficiente]
- common factor [factor común]
- greatest common factor (GCF) [máximo común factor/divisor]

- Evaluate algebraic expressions with rational coefficients.
- Use properties of operations to write equivalent expressions.
- Factor and expand linear expressions with rational coefficients using the distributive property.

How do the activities in *Operating with Rational Numbers* promote student expertise in the TEKS mathematical process standards?

Every topic is written with the goal of creating mathematical thinkers who are active participants in class discourse, so elements of the TEKS mathematical process standards should be evident in all lessons. Students are expected to make sense of problems and work towards solutions, reason using concrete and abstract ideas, and communicate their thinking while providing a critical ear to the thinking of others.

Students are expected to recognize that familiar properties can be applied to rational numbers and to develop precision with the rules as they apply them to the set of rational numbers (7.1F). Algebraic expressions exhibit structure and can be composed and decomposed to reveal that structure or to help learners attend to a particular aspect of that structure. Students are expected to develop precision as they achieve proficiency with the skills of creating and evaluating equivalent expressions with rational coefficients (7.1G). Throughout the topic, they are expected to use number sense to determine whether their answers are reasonable (7.1D).

How can you use cognates to support EB students?

Cognates are provided for new key terms when applicable. Guide students in exploring spelling patterns across cognate pairs, illustrating how English word endings like *-ate*, *-ent*, *-tion*, and *-sion* correspond with Spanish *-ar*, *-ente*, *-ción*, and *-sión*. Point out that double consonants in English often appear as a single consonant in Spanish. Examples of these cognate relationships include *evaluate* with *evaluar*, *coefficient* with *coeficiente*, *notation* with *notación*, and *expression* with *expresión*. As students become adept at recognizing these patterns, they can more easily link new language and vocabulary with their prior knowledge.

MODULE 3, TOPIC 1 PACING GUIDE

3 Reasoning Algebraically

TOPIC 1: Operating with Rational Numbers

1 DAY PACING = 45-MINUTE SESSION

TEKS Mathematical Process Standards: 7.1A, 7.1B, 7.1C, 7.1D, 7.1E, 7.1F, 7.1G

ELPS: 1.D, 1.E, 1.F, 2.D, 2.G, 2.H, 3.A, 3.B, 3.D, 3.G, 4.A, 4.C, 4.K, 5.E

Topic Pacing: 17 Days

Lesson	Lesson Title	Highlights	TEKS*	Pacing
1	Adding and Subtracting Rational Numbers	Students apply their knowledge of adding and subtracting positive and negative integers to a set of rational numbers. **Materials Needed:** Problem-Solving Model Graphic Organizer	7.2A 7.3A **7.3B**	2
2	Quotients of Integers	Students divide integers. They learn that the quotients of any two integers are rational numbers. Students express rational numbers written as negative fractions in equivalent forms by changing the negative sign's position. Finally, they perform operations with positive and negative rational numbers to solve real-world problems. **Materials Needed:** Problem-Solving Model Graphic Organizer	7.3A **7.3B**	2
3	Simplifying Expressions to Solve Problems	Students solve real-world problems involving simplifying numeric expressions using the four operations and signed rational numbers. Students also evaluate expressions with signed rational numbers for a variable and use the order of operations to simplify. **Materials Needed:** Problem-Solving Model Graphic Organizer	7.3A **7.3B** **7.4D**	2
4	Using Number Properties to Interpret Expressions with Signed Numbers	Students solve mathematical problems involving simplifying numeric expressions using number properties and signed rational numbers. Students will also use what they know about the opposites of numbers to derive a method for distributing and factoring with -1 and to convert subtraction to the addition of the opposite of a number. **Materials Needed:** None	7.3A **7.3B** **7.4D**	2

*Bold TEKS = Readiness Standard

MODULE 3, TOPIC 1 PACING GUIDE

150-Day Pacing

Lesson	Lesson Title	Highlights	TEKS*	Pacing*
5	Evaluating Algebraic Expressions	Students review variables, algebraic expressions, and how to evaluate algebraic expressions. They plot a variety of variable expressions with x on a number line, first under the condition that $x > 0$ and then under the condition that $x < 0$, focusing on the distance of x from 0 to determine the placement of the expressions. Students substitute values for the variable to validate the correct placement of the expressions on the number lines. They then substitute values for unknowns in two related contexts. Finally, students formally review evaluating an algebraic expression and practice this skill, with and without tables. **Materials Needed:** Index Cards, Tape	7.3A **7.3B**	**0**
6	Rewriting Expressions Using the Distributive Property	Students rewrite linear expressions using the distributive property. First, they plot related algebraic expressions on a number line by reasoning about magnitude. Students realize that rewriting the expressions reveals structural similarities in the expressions, which allows them to more accurately plot the expressions. They then review the distributive property. Students expand algebraic expressions using both the area model and symbolic representations, focusing on the symbolic. They then reverse the process to factor linear expressions. Students factor expressions by factoring out the greatest common factor and by factoring out the coefficient of the linear variable. Finally, students rewrite expressions in multiple ways by factoring the same value from each term of the expression. **Materials Needed:** None	7.3A **7.3B**	**0**
End of Topic Assessment				1
Learning Individually with Skills Practice *Schedule these days strategically throughout the topic to support student learning.*				**4**

*Bold TEKS = Readiness Standard; Bold Pacing = Reduced Number of Days

Skills practice is flexible

spaced practice = spiral practice

Interleaved prac = more than 1 type of problem or skill set.

use st. data to select "must do" problems

How can you incorporate Skills Practice with students?

There are five Learning Individually days scheduled within this topic. The placement of these days within the topic is flexible. The intent is to distribute spaced and interleaved practice throughout a topic and throughout the year. It is not necessary for students to complete all Skills Practice for the topic and different students may complete different problem sets. You should use data to strategically assign problem sets aligned to individual student needs. You should analyze student responses from the following embedded assessment opportunities to help assess individual needs: Essential Questions, Talk the Talks, Student Self-Reflections, and End of Topic Assessments. For students who are building their proficiency, you can assign problem sets to target specific skills. For students who have demonstrated proficiency, there are extension problems of varied levels of challenge.

Extension probs to challenge sts

How can you identify whether students are ready for new learning?

The Prepare section of the Lesson Assignments and the Spaced Practice sets of Skills Practice can serve as diagnostic tools. Depending on available time, you can assign the Prepare section of the Lesson Assignments as homework or as a warm-up to identify students' prior knowledge for the upcoming lesson's activities. You can also use the Spaced Practice sets of Skills Practice to analyze individual students' level of proficiency on standards from previous topics.

prepare section of the assignment can serve as a warm up or prework.

1 Adding and Subtracting Rational Numbers

LESSON OVERVIEW

Students apply their knowledge of adding and subtracting positive and negative integers to the set of rational numbers.

MATERIALS

Problem-Solving Model
Graphic Organizer

GRADE 7 TEKS

Mathematical Process Standards

(1) The student uses mathematical processes to acquire and demonstrate mathematical understanding.
The student is expected to:

7.1B use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.

7.1F analyze mathematical relationships to connect and communicate mathematical ideas.

7.1G display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Number and Operations

(2) The student applies mathematical process standards to represent and use rational numbers in a variety of forms.
The student is expected to:

7.2A extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of rational numbers.

(3) The student applies mathematical process standards to add, subtract, multiply, and divide while solving problems and justifying solutions.
The student is expected to:

7.3A add, subtract, multiply, and divide rational numbers fluently.

7.3B apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers.

ELPS

(1) Learning Strategies
The student is expected to:

(D) speak using learning strategies such as requesting assistance, employing non-verbal cues, and using synonyms and circumlocution (conveying ideas by defining or describing when exact English words are not known).

(3) Speaking
The student is expected to:

(A) practice producing sounds of newly acquired vocabulary such as long and short vowels, silent letters, and consonant clusters to pronounce English words in a manner that is increasingly comprehensible.

(4) Reading
The student is expected to:

(K) demonstrate English comprehension and expand reading skills by employing analytical skills such as evaluating written information and performing critical analyses commensurate with content area and grade-level needs.

ESSENTIAL IDEAS

- Estimation can be used to approximate the sum or difference of two integers and the sum or difference of other rational numbers.
- The meaning of the number 0 can change depending on the context.
- Addition and subtraction of positive and negative rational numbers can be used to solve real-world problems.
- The rules for operating on integers also apply to operating on rational numbers.

LESSON STRUCTURE AND PACING: 2 DAYS

DAY 1

ENGAGE

Getting Started: Seeing Things Rationally 15–20 minutes
CONNECT TO PRIOR KNOWLEDGE
Students sketch a Venn diagram to show the relationships between rational, integer, whole, and natural numbers. They use the diagram to answer true or false statements related to the relationship between different types of numbers.

DEVELOP

Activity 1.1: Sum of Rational Numbers Problems 20–25 minutes
WORKED EXAMPLE, REAL-WORLD PROBLEM SOLVING
Students analyze a Worked Example modeling a solution to a word problem involving the addition of signed rational numbers. Students then answer questions about the Worked Example and determine the solutions to a variety of rational number addition word problems.

DAY 2

Activity 1.2: Rational Number Difference Problems 15 minutes
WORKED EXAMPLE, REAL-WORLD PROBLEM SOLVING
Students analyze a Worked Example modeling a solution to a word problem involving the subtraction of signed rational numbers. Students then answer questions about the Worked Example and determine the solutions to a variety of rational number subtraction word problems.

Activity 1.3: Adding and Subtracting Rational Numbers 20 minutes
MATHEMATICAL PROBLEM SOLVING
Students practice solving mathematical problems using addition or subtraction of signed rational numbers.

DEMONSTRATE

Talk the Talk: Mixing Up the Sums 10 minutes
EXIT TICKET PROCEDURE
Students demonstrate their facility with rational numbers by writing positive and negative fractions and decimals as the sum of two rational numbers. They create a number line model to explain their answer.

Getting Started

ENGAGE

Seeing Things Rationally

Facilitation Notes

In this activity, students sketch a Venn diagram to show the relationships between rational, integer, whole, and natural numbers. They use that diagram to answer true or false statements related to the relationship between different types of numbers.

Ask a student to read the introduction aloud and discuss as a class. Have students work in pairs or groups to complete Questions 1 and 2. Share and discuss responses as a class.

QUESTIONS TO SUPPORT DISCOURSE

Gathering	• Provide an example for each subset of numbers.
Probing	• Which subset of numbers do we work with most often? • Which subset of numbers do we work with least often?

Summary

Natural numbers are a subset of whole numbers, which are a subset of integers, which all fall under the umbrella of rational numbers.

STAMP THE LEARNING

ACTIVITY 1.1

Sum of Rational Numbers Problems

DEVELOP

Facilitation Notes

In this activity, students apply rules for adding positive and negative numbers to adding signed numbers that have fractions and decimals.

Ask a student to read the introduction aloud. Review the Worked Example as a class and complete Questions 1 through 3.

QUESTIONS TO SUPPORT DISCOURSE

Gathering	• What model did Natalia use? • What rule was applied to calculate the final sum? • What integers could you use to provide a numeric estimate of her progress toward her goal?
Probing	• How can money be negative? What does negative money mean in this situation? • What does 0 mean in this situation?
Seeing structure	• Is there another way to write the equation for this situation?

Have students work with a partner or in a group to complete Questions 4 through 8. Assign each group one of the problems to share with the class. Be sure that they share the model they sketched to make their estimate as well as the equation and solution to the problem.

DIFFERENTIATION STRATEGY

Just in Time Support

Provide students with a visual timeline showing BC and AD as they complete Question 6.

QUESTIONS TO SUPPORT DISCOURSE

Gathering	• How many feet did the drilling crew dig on the second day? • What rule should be applied to determine the solution? • What model can be used in this situation? • What must be determined first to answer the question?
Probing	• What equation did Kaya use? Mario? Did you have to solve this problem to determine who was correct? Why or why not? • What equation did Samantha use? Trung? Did you have to solve this problem to determine who was correct? Why or why not? • Is 1800 BC a positive or negative integer? Is 1489 years later a positive or negative integer? • Is money owed considered a positive or negative amount? • What is the height of Mauna Kea? How did you determine the height?

To close the Day 1 session, have students reread the Essential Question and read the activity summaries to the class.

STAMP THE LEARNING

Summary

Rules for adding positive and negative integers also apply to adding rational numbers.

ACTIVITY 1.2

Day 2

Rational Number Difference Problems

Facilitation Notes

In this activity, students apply rules for subtracting positive and negative numbers to subtracting signed numbers that have fractions and decimals.

To begin the Day 2 session, have a student read the Essential Question aloud.

ST Reads

Review the Worked Example as a class and complete Questions 1 and 2.

ST TASK (Teacher models worked Example) p.332

QUESTIONS TO SUPPORT DISCOURSE

Gathering	• How is this example different than the Worked Example in the previous activity? • What model can be used to solve this problem?
Probing	• What rule applies to this situation? • How can absolute value be used in this situation?
Seeing structure	• Is there another way to write the equation for this situation?

Have students work with a partner or in a group to complete Questions 3 through 5. Share responses as a class.

DIFFERENTIATION STRATEGY

Just in Time Support

Suggest students draw a diagram to make sense of the given information.

QUESTIONS TO SUPPORT DISCOURSE

Gathering	• What model was used to estimate the answer? • What model can be used to determine the difference between the two mixed numbers? • What rule can be used to determine the difference between the two mixed numbers? • What model was used to estimate the answer?
Probing	• Is 18° colder represented by a positive or negative integer? Q3 • How do you work with fractions that have different denominators? Q4 • How far does the roller coaster go underground? Q5

Summary

Rules for subtracting positive and negative integers also apply to subtracting rational numbers.

STAMP THE LEARNING

ACTIVITY 1.3

Day 2

Adding and Subtracting Rational Numbers

- can omit this activity but it does provide SB w/ good practice

Facilitation Notes

In this activity, students determine sums and differences of rational numbers, including positive and negative decimals, fractions, and mixed numbers.

Have students work with a partner to complete Questions 1 through 20. Share responses as a class.

DIFFERENTIATION STRATEGY

Access for All

Assign half the pairs the odd-numbered problems and the other half the even-numbered problems. Then, have pairs switch papers and check the work of a group's problem set they did not complete.

- Select must do problems in green
- Select can do problems in yellow.

QUESTIONS TO SUPPORT DISCOURSE

Gathering	• Are you determining the sum or the difference in this situation? • What rule did you apply to solve this problem? • How did you rewrite this problem as an addition problem?
Probing	• Explain how you added or subtracted the decimals. • Explain how you added or subtracted the fractions. • How do you know that your answer is reasonable? • At a glance, can you tell if the answer to the problem will be greater than zero, less than zero, or equal to zero?

STAMP THE LEARNING

Summary

Rules for adding and subtracting positive and negative integers also apply to adding and subtracting rational numbers.

Day 2 - possibly omit

Talk the Talk

MIXING UP THE SUMS

DEMONSTRATE

- can substitute w/ exit ticket (SMART Release Items).

Facilitation Notes

Students demonstrate their facility with rational numbers by writing positive and negative fractions and decimals as the sum of two rational numbers. They create a number line model to explain their answer.

Have students work with a partner to complete Questions 1 through 5. Share responses as a class.

QUESTIONS TO SUPPORT DISCOURSE

Gathering	• Between which two integer values does (−2.1) lie? • Between which two integer values does $4\frac{7}{9}$ lie?
Seeing structure	• Is this value equivalent to −2 + 0.1 or −2 − 0.1? Explain your thinking. • If you decomposed this number into 5 and $\frac{2}{3}$ what is the sign of each component? • If you decomposed this number into 4 and $\frac{7}{9}$ what is the sign of each component? • Explain the similarities and differences in rewriting positive and negative values.

COMMON MISCONCEPTION

When students decompose a negative mixed number as its whole number value and its fractional part, they may make a sign error by adding the fractional part instead of subtracting it. Help them to use the number line to see why this reasoning is incorrect.

Have students read and answer the Essential Question on the lesson opener page.

Summary

Rational numbers can be represented as the sum of two other rational numbers on the number line.

STAMP THE LEARNING

ST. PAGES

1 Adding and Subtracting Rational Numbers

OBJECTIVES

- Interpret and determine sums and differences of rational numbers in real-world contexts.
- Represent and apply the additive inverse in real-world contexts.
- Determine distance as the absolute value of the difference between two signed numbers in real-world contexts.
- Solve real-world and mathematical problems involving operations with rational numbers.

You have learned how to add and subtract with signed numbers using models and rules.

How can you solve real-world problems by adding and subtracting signed numbers?

Getting Started

Seeing Things Rationally

Mats: chart paper
- sticky notes
- markers

Ⓐ students READ →

The set of integers is a subset of the rational numbers. The set of rational numbers also includes mixed numbers, fractions, and their decimal equivalents.

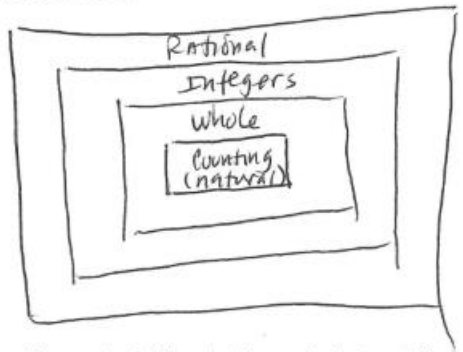
Ⓑ Sts develop Anchor Chart

Remember that the set of rational numbers are all numbers that can be written as $\frac{a}{b}$, where a and b are integers and $b \neq 0$.

Ⓒ Show C W Int R — Acronym

1. Sketch a Venn diagram to show all of the sets and subsets of numbers that you know.

Ⓓ place #s on the anchor chart sticky notes



Ⓔ Sts in pairs of sm groups ans Ques. 2a & 2b

2. Use your Venn diagram to decide whether each statement is true or false. Explain your reasoning.

   a. An integer is sometimes a rational number.

   False - all integers are rational numbers

   b. A rational number is always an integer.

   False. Integers are rational numbers, but mixed numbers, fractions & their decimal equivalents are also rational #s

ACTIVITY 1.1

Sum of Rational Numbers Problems

You can use what you know about adding and subtracting positive and negative integers to solve problems with rational numbers.

Yesterday, Natalia was just $23.75 below her fundraising goal. She got a check today for $12.33 to put toward the fundraiser. Describe Natalia's progress toward the goal.

(A) st Reads out loud.

WORKED EXAMPLE

(B) I model this example from power point

You can model this situation using addition:

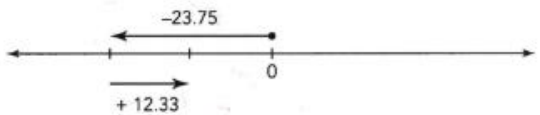
(C) Question - model: #line - money: negative (owe)

$$\underset{\text{currently below the goal}}{-\$23.75} + \underset{\text{got a check for this amount}}{\$12.33}$$

"Zero means doesn't owe any money."

- Estimate.

  Natalia will still be below her goal, because $-23.75 + 12.33 < 0$.



- Determine the sum.

  (D) sts work Q1-3

  $-23.75 + 12.33 = -11.42$

1. Explain how the final sum was calculated.

- use the same rule for combining integers to combine rational numbers.
- subtract 12.33 from 23.75 & include the negative sign with the result.
- Rule: positive plus negative → subtract & use sign of larger number.

2. What does the sum mean in terms of the problem situation?

Natalia is still $11.42 short of her goal.

Anchor chart ↓ or slide

+ + + ⇒ Add ⇒ +

− + − ⇒ Add ⇒ −

+ + − ⇒ subt ⇒ sign of larger #

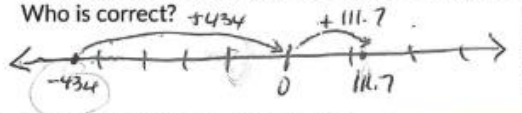
3. Explain how you can know that addition is the correct operation to use to solve this problem.

The $12.33 check is combined with Natalia's current status. Addition is used

Sketch a model to estimate each sum or difference. Then, determine each solution and write an equation.

4. The table shows the freezing points of some of the elements in the periodic table.

a. Kaya and Mario are trying to figure out how much the temperature would have to increase from the freezing point of hydrogen to reach the freezing point of phosphorus. Kaya says the temperature would have to increase 545.7°, and Mario says the temperature would have to increase 322.3°. Who is correct?



Kaya is correct

b. Trung and Samantha are trying to figure out how much the temperature would have to increase from the freezing point of nitrogen to reach the freezing point of mercury. Trung says the temperature would have to increase $308\frac{1}{20}°$, and Samantha says the temperature would have to increase $383\frac{9}{20}°$. Who is correct?

Element	Freezing Point (°F)
Helium	−458
Hydrogen	−434
Oxygen	−368.77
Nitrogen	$-345\frac{3}{4}$
Chlorine	−149.51
Mercury	$-37\frac{7}{10}$
Phosphorus	111.7

5. A drilling crew dug to a height of $-45\frac{1}{4}$ feet during their first day of drilling. On the second day, the crew dug down $9\frac{1}{3}$ feet more than on the first day. What is the total distance that the drilling crew dug at the end of the second day?

Challenge problem

$-45\frac{1}{4} \times 3 = \frac{3}{12}$

$-9\frac{1}{3} \times 3 = \frac{9}{12}$

$-54\frac{7}{12}$

1st Day $-45\frac{1}{4} \times 3 \; \frac{3}{12}$

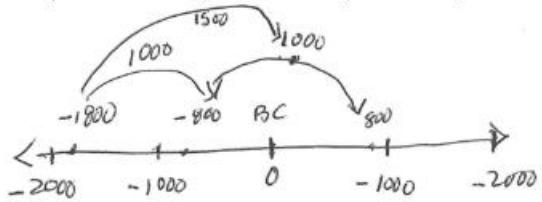
2nd Day $-54\frac{7}{12} \; \frac{7}{12}$

$-99\frac{5}{6} \leftarrow \frac{10}{12}$

* Rule − + − Add −

PROBLEM SOLVING

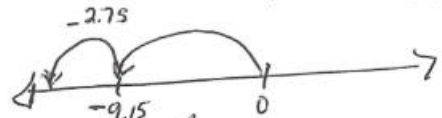
6. The ancient Babylonians were writing fractions in 1800 BC. But they did not have a concept of zero until about 1489 years later. In what year did the Babylonians develop the concept of zero?



(−) 1800
(+) 1489
−311 BC

7. Andrew purchased lunch today at the school cafeteria for $2.75. Before today, Andrew owed $9.15 on his lunch account. What is the status of his lunch account after today?

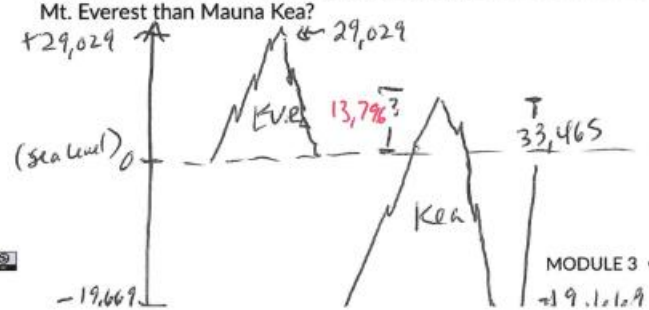
* Rule − + − Add ⇒ −



Andrew owes $11.90

−2.75
−9.15
−11.90

8. The highest mountain in the world is Mt. Everest, whose peak is 29,029 feet above sea level. But the tallest mountain is Mauna Kea. The base of Mauna Kea is 19,669 feet below sea level, and its peak is 33,465 feet above its base. How much higher above sea level is Mt. Everest than Mauna Kea?



33,465 − 19,669 = 13,79

29,029 − 13796 = 15,23

ACTIVITY 1.2

Rational Number Difference Problems

ST Reads problem

The freezing point of chlorine is −149.51° Fahrenheit. The element zinc freezes at much higher temperatures. The freezing point of zinc is 787.51° Fahrenheit. How many more degrees is the freezing point of zinc than the freezing point of chlorine?

I model worked Example powerpoint #1ive

WORKED EXAMPLE

You can model this situation using subtraction:

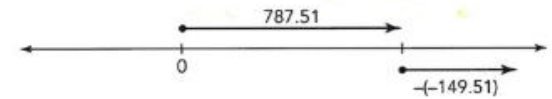
787.51 − (−149.51)

787.51 — freezing point of zinc

(−149.51) — freezing point of chlorine

- Estimate.

The answer is greater than 787.51, because 787.51 − (−149.51) = 787.51 + 149.51.



- Determine the difference. Write an equation.

787.51−(−149.51) = 937.02

Possible questions
- What model can be used to solve this prob.
- what rule applies to this situation?

Review Q1 & 2 w/ class

1. What does the difference mean in terms of the problem situation?

The freezing point of zinc is 937.02 degrees greater than the freeze pt of chlorine

2. Explain how you can check the answer.

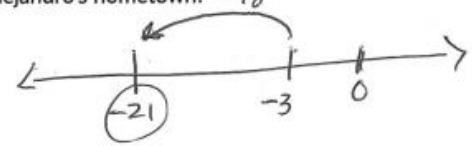
Add 787.51 & 149.51

Sketch a model to estimate. Then determine each solution and write an equation.

3. The temperature in Wichita, Kansas, is −3°C. The temperature in Alejandro's hometown is 18° colder than that. What is the temperature in Alejandro's hometown? −18

* rule − + − ⇒ Add ⇒ −

- Assign 1 problem (3-5) to a sm group of sts.
Diff strat
- Have sts draw a diagram (# line)

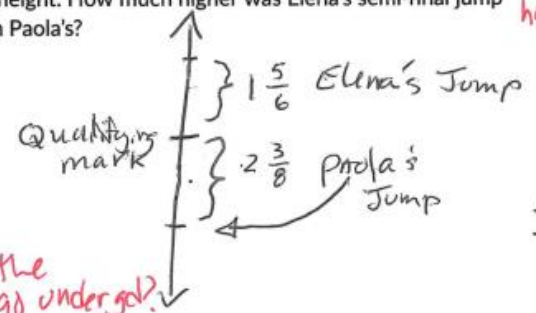


Q: is 18° colder represented by a positive or neg #.

EQ. $-3 + -18 = -21$

4. To qualify to compete in the high jump finals, athletes must jump a certain height in the semi-finals. Paola jumped $2\frac{3}{8}$ inches below the qualifying height, but her friend Elena made it to $1\frac{5}{6}$ inches over the qualifying height. How much higher was Elena's semi-final jump compared with Paola's?

Q: How do you work with fractions that have diff. denoms?



$1\frac{5}{6} \times \frac{4}{4} = \frac{20}{24}$

$2\frac{3}{8} \times \frac{3}{3} = \frac{9}{24}$

$+$

$3 \quad \frac{29}{24}$

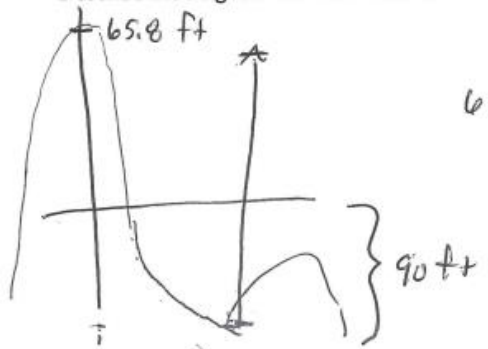
$3 + 1\frac{5}{24}$

$4\frac{5}{24}$

$24\overline{)29}$ R 5

5. The Down Under roller coaster rises up to 65.8 feet above the ground before dropping 90 feet into an underground cavern. Describe the height of the roller coaster at the bottom of the cavern.

Q: How far does the roller coaster go underground?



$65.8 + -90 = 24.2$

$\begin{array}{r} 8\,9\,1 \\ -\,90.0 \\ +\,65.8 \\ \hline 24,2 \text{ ft} \end{array}$

ACTIVITY 1.3

Adding and Subtracting Rational Numbers

must do's problems

can do's problems

Determine each sum or difference.

1. 4.7 + (−3.65)

$\begin{array}{r} +\,4.70 \\ -\,3.65 \\ \hline 1.05 \end{array}$

2. $-\frac{2}{3} + \frac{5}{8}$

$-\frac{2}{3} \times \frac{8}{8} = \frac{-16}{24}$

$+\frac{5}{8} \times \frac{3}{3} \quad \frac{15}{24}$

$-\frac{1}{24}$

3. 3.95 + (−6.792)

$\begin{array}{r} 5\,\overset{1}{6}.\overset{1}{7}92 \\ -\,3.950 \\ \hline 2.842 \end{array}$

4. $2\frac{5}{7} + \left(-1\frac{1}{3}\right)$

$+\,2\frac{5}{7} \times \frac{3}{3} = +\frac{15}{21}$

$+\,(-1)\frac{1}{3} \times \frac{7}{7} \quad -\frac{7}{21}$

$1\frac{8}{21}$

5. $-\frac{3}{4} + \frac{5}{8}$

$\frac{1}{8}$

$-\frac{3}{4} \times \frac{2}{2} = -\frac{6}{8}$

$+\frac{5}{8} \quad \frac{5}{8}$

$-\frac{1}{8}$

6. −7.38 − (−6.2)

$-7.38 + 6.2$

$\begin{array}{r} -7.38 \\ +\,6.20 \\ \hline -1.18 \end{array}$

7. $-\frac{3}{4} - \frac{5}{8}$

$-\frac{3}{4} - \frac{5}{8} \Rightarrow -\frac{3}{4} + -\frac{5}{8} \Rightarrow$

$\Rightarrow \quad -\frac{3}{4}$

$-\frac{3}{4} \times \frac{2}{2} = -\frac{6}{8}$

$+\quad -\frac{5}{8} \quad -\frac{5}{8}$

$-\frac{11}{8}$

8. $-2\frac{5}{6} + 1\frac{3}{8}$

$-\,2\frac{5}{6} \times \frac{4}{4} \quad -\frac{20}{24}$

$+\,1\frac{3}{8} \times \frac{3}{3} \quad +\frac{9}{24}$

$-1\frac{11}{24}$

9. $-\frac{7}{12} - \frac{5}{6} \Rightarrow -\frac{7}{12} + -\frac{5}{6}$

$-\frac{7}{12} = -\frac{7}{12}$

$-\frac{5}{6} \times \frac{2}{2} = -\frac{10}{12}$

$+$

$-\frac{17}{12} = -1\frac{5}{12}$

10. −37.27 + (−13.2)

Rule − + − Add ⇒ −

$\begin{array}{r} -37.27 \\ -\,13.20 \\ \hline -\,50.47 \end{array}$

11. $-0.8 - (-0.6)$

$-0.8 + 0.6$

-0.8
$+0.6$
-0.2

12. $2\frac{3}{7} + \left(-1\frac{3}{4}\right)$

$+ 2\frac{3}{7} \times 4 = \frac{+12}{28}$ | $\frac{12}{28} = \frac{+40}{28}$

$- 1\frac{3}{4} \times 7 = \frac{-21}{28}$ $= \frac{-21}{28}$

$= \frac{19}{28}$

13. $0.67 + (-0.33)$

$+0.67$
-0.33
$+0.34$

14. $-42.65 - (-16.3)$

$-42.65 + 16.3$

-42.65
$+16.30$
-26.35

15. $-7300 + 2100$

-7300
$+2100$
$-5,200$

16. $-3\frac{5}{8} - \left(-2\frac{1}{3}\right)$

$-3\frac{5}{8} + 2\frac{1}{3}$ $\quad -3\frac{5}{8} \times 3 = -\frac{15}{8}$

$+2\frac{1}{3} \times 8 = +\frac{8}{24}$

$-1\frac{7}{24}$

Rule:
$- + +$ subt $\Rightarrow$ sign of larger #

17. $-4.7 + 3.16$

-4.70
$+3.16$
-1.54

18. $26.9 - (-3.1)$

$26.9 + 3.1$

26.9
$+3.1$
30.0

19. $-325 + (-775)$

-325
$+-775$
1100

20. $-2\frac{1}{5} - 1\frac{3}{10}$

$-2\frac{1}{5} + -1\frac{3}{10}$

$-2\frac{1}{5} \times 2 = -2\frac{2}{10}$

$+ -1\frac{3}{10} \times 1 = -1\frac{3}{10}$

$-3\frac{5}{10}$

$\Downarrow$

$-3\frac{1}{2}$

Rule:
$- + -$ Add $\Rightarrow -$

can omit the TOTK the TOTK

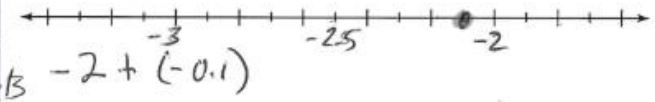
Can substitute w ~~STAR~~ items as exit tickets

Talk the Talk

Mixing Up the Sums

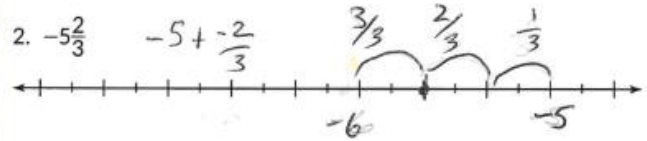
Represent each number as the sum of two rational numbers. Use a number line to explain your answer.

1. -2.1

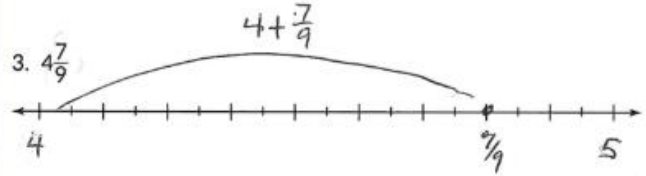


$-2 + (-0.1)$

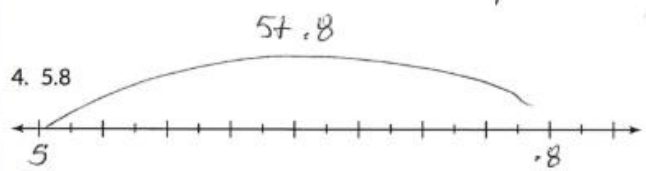
2. $-5\frac{2}{3}$



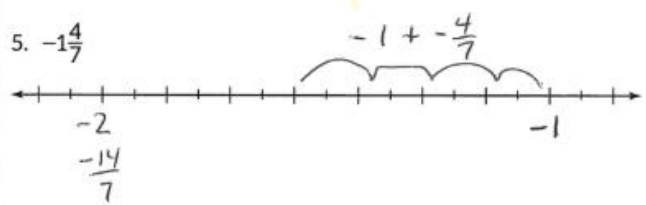
3. $4\frac{7}{9}$



4. 5.8



5. $-1\frac{4}{7}$



Lesson 1 Assignment

Write

Explain in your own words how adding and subtracting positive and negative numbers with fractions and decimals is different from and similar to adding and subtracting with whole numbers.

Remember

The opposite of a number is called the additive inverse of the number. The absolute value of the difference between two numbers is a measure of the distance between the numbers.

Practice

Calculate each sum. Be sure to estimate first.

1. $12\frac{2}{5} + \left(-3\frac{1}{4}\right)$

2. $5.3 + (-7.45)$

3. $-\frac{5}{8} + 8\frac{3}{8}$

Calculate each difference. Estimate before calculating.

4. $-8.38 - 11.29$

5. $7\frac{2}{3} - \left(-4\frac{1}{4}\right)$

6. $-4\frac{5}{6} - 6\frac{2}{3}$

7. $-1.3 - (-2.4)$

Lesson 1 Assignment

Prepare

Classify each number into as many categories as it belongs: natural number, whole number, integer, rational number.

1. -3

2. $\frac{1}{2}$

3. 0

4. 5

End of Topic Assessment

Name _____ Date _____

7.3A (S) 1PT

1. Andrew is putting mulch in a playground area that he built in his yard. He already has $4\frac{1}{2}$ bags of mulch to use. Each bag of mulch covers 90.7 square feet. How many square feet will Andrew be able to cover if he uses all of this mulch?

★ A. 385.475 ft²

B. 408.15 ft²

C. 362.8 ft²

D. 360.175 ft²

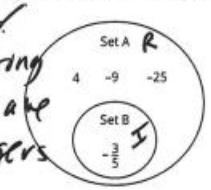
90.7 · 4.25 = 385.475

4.25 × 90.7 = 2975 + 3825 = 385.475

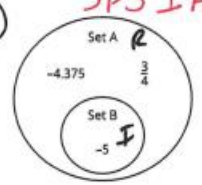
7.2A (S) 1PT

2. Set A represents rational numbers. Set B represents integers. Which diagram shows the numbers placed in the correct sets?

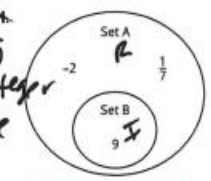
F.



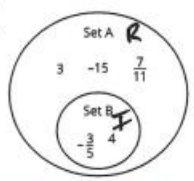
★ G.



H.



J.



−4.375 is a decimal and $\frac{3}{4}$ is a fraction. Decimals and fractions are rational numbers that are not integers. −5 is an integer.

Notes

7.2A (S) WHOLE INT R W/ Diagram

7.3A (S)
Dec w/ Frac ||||
Dec / Frac WORD ||
Dec / whole # ||

SPS - Skills Practice Set
L APQ - Lesson Assignment Practice Question
SPES - Skill Practice Extension Set

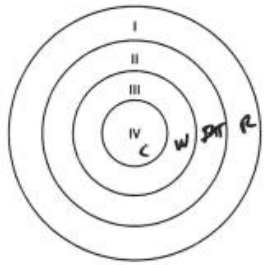
Notes

7.2A (S) 2pts

C W INT R

SPS 1A

3. The Venn Diagram represents the relationship between integers, natural numbers, rational numbers, and whole numbers.



Which number set is best represented by each section label in the diagram? Select the correct answer in each row.

Number Set	Section I	Section II	Section III	Section IV
Integers		X ✓		
Natural Numbers (counting #)				X ✓
Rational Numbers	X ✓			
Whole Numbers			X ✓	

Notes

4. Determine the value of the expression. $-3\frac{4}{5} \div -3\frac{1}{6}$

$1\frac{1}{5}$

Rule: Negative ÷ negative is positive

$-3\frac{4}{5} \div -3\frac{1}{6}$

$\frac{-19}{5} \div \frac{-19}{6} \Rightarrow \frac{-19}{5} \cdot \frac{-6}{19} \Rightarrow \frac{+6}{5} = +1\frac{1}{5}$

5. Determine the value of the expression. $-6.2\left(2\frac{3}{4}\right)$

$-17\frac{1}{20}$ or -17.05

$-6.2 \times 2\frac{3}{4}$

-6.2×2.75

2.75×-6.2

1550

1650

17.050

6. Alyssa needs to cut a 12-inch loaf of bread into slices that are $\frac{5}{6}$ inch thick.

a. How many $\frac{5}{6}$-inch thick slices can Alyssa cut from the 12-inch loaf of bread?

$12 \div \frac{5}{6} = 12 \cdot \frac{6}{5} = \frac{72}{5} = 14\frac{2}{5}$

There are 14 full slices that can be cut from the 12-inch loaf of bread, and $\frac{2}{5}$ of a $\frac{5}{6}$-inch slice would be left over.

$12 \div \frac{5}{6} \Rightarrow 12 \cdot \frac{6}{5} \Rightarrow \frac{12}{1} \cdot \frac{6}{5}$

$\Rightarrow \frac{72}{5} \Rightarrow$

$14\frac{2}{5}$

$5\overline{)72}$

5

22

20

14 full slices

b. How many inches of bread would be left over?

$\frac{2}{5} \cdot \frac{5}{6} = \frac{2}{6} = \frac{1}{3}$

There would be $\frac{1}{3}$ inch of bread left over.

$\frac{2}{5} \cdot \frac{5}{6} = \frac{2}{6} = \frac{1}{3}$

Notes

7. Natalia gave the store clerk $40.00 to pay for 2 pairs of leggings. The store clerk gave her $7.12 in change. Each pair of leggings costs the same amount. What is the cost in dollars and cents for each pair of leggings? Explain your reasoning.

$16.44

The cost of 2 pairs of leggings is the amount Natalia gives the clerk minus her change. 40 − 7.12 = 32.88. The cost of the 2 pairs divided by 2 gives the cost of 1 pair. 32.88 ÷ 2 = 16.44.

$40.00 - 7.12 = 32.88$

$32.88 \div 2 = 16.44$

$2\overline{)32.88}$

-2

12

12

8

8

8. Kaya biked a distance of $6\frac{1}{2}$ miles each day for 3 days. Then, she biked $7\frac{1}{4}$ miles each day for the next 5 days. What was the total distance in miles that Kaya biked during these 8 days?

$55\frac{3}{4}$ mi

$6\frac{1}{2} \cdot 3 = 19\frac{1}{2}$

$7\frac{1}{4} \cdot 5 = 36\frac{1}{4}$

$19\frac{1}{2} + 36\frac{1}{4} = 55\frac{3}{4}$

$6\frac{1}{2} \times 3 \Rightarrow 6.5 \times 3 = 19.5$

$7\frac{1}{4} \times 5 \Rightarrow 7.25 \times 5 = 36.25$

$55\frac{3}{4}$

19.50

55.75

9. Samantha uses a cafeteria account to pay for meals at school. She got a notice saying she owed the school $7.82. The next day, she gave the school a check to add $15.75 to her account and spent $2.25 on lunch. How much money in dollars and cents does Samantha now have in her cafeteria account?

$5.68

$-7.82 + 15.75 - 2.25 = 5.68$

$-7.82 + 15.75 - 2.25$

$-10.07 + 15.75 = 5.68$

7.82

2.25

10.07

15.75

$-\ 10.07$

5.68

SPS III A
L3 ApQ 1-3

10. Alejandro has 180 pumpkins to sell.

- $\frac{1}{4}$ of the pumpkins are lumina pumpkins.
- $\frac{1}{6}$ of the pumpkins are jack o'little pumpkins.
- $\frac{1}{10}$ of the pumpkins are sugar pie pumpkins.
- The rest of the pumpkins are cotton candy pumpkins.

How many pumpkins are cotton candy pumpkins?

A. 30 Lumina: $\frac{1}{4} \cdot 180 = 45$

B. 45 Jack o'Little: $\frac{1}{6} \cdot 180 = 30$

★ C. 87 Sugar Pie: $\frac{1}{10} \cdot 180 = 18$

D. 90 Cotton Candy: $180 - (45 + 30 + 18) = 180 - 93 = 87$

11. What is the value of the expression $-4\frac{1}{4} - (-5\frac{3}{8})$?

$1\frac{1}{8}$

7.3B (R) 1pt

$180 \times \frac{1}{4} \Rightarrow 180 \times .25 = 45$

$180 \times \frac{1}{6} \Rightarrow 180 \times .16 = 29$

$180 \times \frac{1}{10} \Rightarrow 180 \times .10 = 18$

$45 + 29 + 18 = 92$

$180 - 92 = 88 = 87$

Notes 36

7.3A (S) 1pt

Rule for subt
- chg − to Add
- chg sign of 2nd #

$-4\frac{1}{4} - (-5\frac{3}{8})$

$-4\frac{1}{4} + 5\frac{3}{8}$

$+5\frac{3}{8} = \frac{3}{8}$

$-4\frac{1}{4} \times 2 = \frac{2}{8}$

$1\frac{1}{8}$

SPS IV B
L4 ApQ 1-3