

Agenda:

1) Warm Up- p. 84

2) Go over homework answers in your groups

3) Module 2- Rational Numbers

Lesson 9: Adding and subtracting rational numbers

- What are rational numbers?
- How do you add and subtract rational numbers? Which method will you use?
- How are properties useful in adding and subtracting?

4) Homework: Lesson 9 (1-5)  
Integer Project Due 11/30

5) Exit Ticket

Sep 7-12:49 PM

## Adding and Subtracting Integers (C) Answers

Find the sum or difference for each question.

$$(-9) + (-6) = (-15)$$

$$(+9) + (-9) = (0)$$

$$(-5) + (-3) = (-8)$$

$$(-5) + (+5) = (0)$$

$$(-2) + (0) = (-2)$$

$$(-5) + (-4) = (-9)$$

$$(+9) + (+9) = (+18)$$

$$(+7) - (+3) = (+4)$$

$$(+9) + (+7) = (+16)$$

$$(+6) + (-8) = (-2)$$

$$(+7) - (+1) = (+6)$$

$$(+2) + (-2) = (0)$$

$$(+8) + (-9) = (-1)$$

$$(-5) + (0) = (-5)$$

$$(-4) + (+4) = (0)$$

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$$(+4) + (-7) = (-3)$$

$$(+3) + (-5) = (-2)$$

$$(+3) + (+5) = (+8)$$

$$(+6) + (-8) = (-2)$$

$$(-8) + (+4) = (-4)$$

$$(-9) + (+4) = (-5)$$

$$(-7) + (-2) = (-9)$$

$$(-11) + (-6) = (-17)$$

$$(-12) + (-3) = (-15)$$

$$(+10) - (+4) = (+6)$$

$$(-5) - (+4) = (-9)$$

$$(-5) - (+3) = (-8)$$

$$(+4) + (+4) = (+8)$$

$$(+5) + (+8) = (+13)$$

$$(-6) + (-1) = (-7)$$

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① Quiz - in folder

② take out Hw -

③ Start Lesson 9 Packet

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## Integer Project

- **Part I.** Create an integer poster using a real-life situation
- Poster must include a number line with positives, negatives, and zero clearly labeled
- Intervals must be consistent (you cannot count by 3s and then change to 5s)
- Poster must include a Title
- **Part II.** To go along with your poster you must create 4 word problems involving integers
- Word problems are to be typed on a separate piece of paper and include an answer key
- **Project is due 11/24**

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### Problem Set

1. Represent each sum as a single rational number.

a.  $-14 + \left(-\frac{8}{9}\right) = -14\frac{8}{9}$

b.  $7 + \frac{1}{9} = 7\frac{1}{9}$

c.  $-3 + \left(-\frac{1}{6}\right) = -3\frac{1}{6}$

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Rewrite each of the following to show that *the opposite of a sum is the sum of the opposites*. Problem 4 has been completed as an example.

2.  $-(9 + 8) = -9 + (-8)$   
 $-17 = -17$

3.  $-(\frac{1}{4} + 6)$   
 $-(6\frac{1}{4}) = -6\frac{1}{4}$

4.  $-(10 + (-6))$   
 $-10 + 6 = -4$      $-(10 + -6)$   
 $-4$

5.  $-((-55) + \frac{1}{2})$   
 $55 + (-\frac{1}{2})$   
 $54\frac{1}{2}$

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6. Meghan said the opposite of the sum of -12 and 4 is 8. Do you agree? Why or why not?

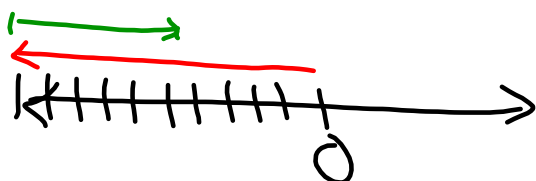
$12 + (-4) = 8$

$+(-12) + 4 = -8$      $-(-8) = 8$

yes

7. Jolene lost her wallet at the mall. It had \$10 in it. When she got home her brother felt sorry for her and gave her \$5.75. Represent this situation with an expression involving rational numbers. What is the overall change in the amount of money Jolene has?

$-10 + 5.75$



$-4.25$

$$\begin{array}{r} 9 \ 9 \ 10 \\ 10.00 \\ - 5.75 \\ \hline 4.25 \end{array}$$

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8. Isaiah is completing a math problem and is at the last step:  $25 - 28\frac{1}{5}$ . What is the answer? Show your work.

$$25 - 28 = -3 \quad -3 + (-\frac{1}{5}) = -3\frac{1}{5}$$

9. A number added to its opposite equals zero. What do you suppose is true about *a sum added to its opposite*?

Use the following examples to reach a conclusion. Express the answer to each example as a single rational number.

- a.  $(3 + 4) + (-3 + -4)$   
 b.  $(-8 + 1) + (8 + (-1))$   
 c.  $(-\frac{1}{2} + (-\frac{1}{4})) + (\frac{1}{2} + \frac{1}{4})$

$$a) 7 + (-7) = 0$$

$$b) -7 + (7) = 0$$

c)

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## Lesson 9: Applying the Properties of Operations to Add and Subtract Rational Numbers

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### Classwork

#### Exercise 1

Unscramble the cards, and show the steps in the correct order to arrive at the solution to  $5\frac{2}{9} - (8.1 + 5\frac{2}{9})$ .

$$5\frac{2}{9} + (-8.1 + (-5\frac{2}{9}))$$

$$5\frac{2}{9} + (-5\frac{2}{9} + (-8.1))$$

$$(5\frac{2}{9} + (-5\frac{2}{9})) + (-8.1)$$

$$0 + (-8.1)$$

$$-8.1$$

Commutative

Assoc.

opposites  
add to 0

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#### Examples 1 and 2

Represent each of the following expressions as one rational number. Show your steps.

1.  $4\frac{4}{7} - (4\frac{4}{7} - 10)$

$$4\frac{4}{7} + (-4\frac{4}{7} + 10)$$

$$(4\frac{4}{7} + (-4\frac{4}{7})) + 10$$

$$0 + 10$$

$$10$$

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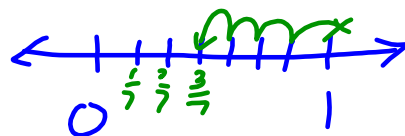
2.  $5 + (-4\frac{4}{7})$

$$5 + (-4) + (-\frac{4}{7})$$

$$1 + (-\frac{4}{7})$$

$$\frac{3}{7}$$

$$\frac{7}{7} - \frac{4}{7} = \frac{3}{7}$$



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Exercise 2: Team Work!

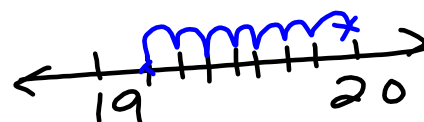
a.  $-5.2 - (-3.1) + 5.2$

$$-5.2 + (+3.1) + 5.2$$

$$-5.2 + 5.2 + 3.1$$

$$0 + 3.1$$

$$3.1$$



c.  $32 + (-12\frac{7}{8})$

$$32 + (-12) + (-\frac{7}{8})$$

$$20 + (-\frac{7}{8})$$

$$19\frac{1}{8}$$

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b.  $3\frac{1}{6} + 20.3 - (-5\frac{5}{6})$

d.  $\frac{16}{20} - (-1.8) - \frac{4}{5}$

$$3\frac{1}{6} + 20.3 + 5\frac{5}{6}$$

$$3\frac{1}{6} + 5\frac{5}{6} + 20.3$$

$$3 + \frac{1}{6} + 5 + \frac{5}{6}$$

8 + 1

$$9 + 20.3$$

$$29.3$$

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### Exercise 3

Explain step by step, how to arrive at a single rational number to represent the following expression. Show both a written explanation and the related math work for each step.

$$-24 - \left(-\frac{1}{2}\right) - 12.5$$

$$-24 + \frac{1}{2} - 12.5$$

$$-24 + \cancel{\frac{1}{2}} + (-12) + (\cancel{-.5})$$

$$-36$$

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### Lesson Summary

- Use the properties of operations to add and subtract rational numbers more efficiently. For instance:

$$-5\frac{2}{9} + 3.7 + 5\frac{2}{9} = \left(-5\frac{2}{9} + 5\frac{2}{9}\right) + 3.7 = 0 + 3.7 = 3.7.$$

- The opposite of a sum is the sum of its opposites as shown in the examples that follow:

$$-4\frac{4}{7} = -4 + \left(-\frac{4}{7}\right).$$

$$-(5 + 3) = -5 + (-3).$$

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### Problem Set

## Homework

Show all steps taken to rewrite each of the following as a single rational number.

1.  $80 + \left(-22\frac{4}{15}\right)$

$$57\frac{11}{15}$$

$$\begin{array}{r} 79\frac{15}{15} \\ -22\frac{4}{15} \\ \hline 57\frac{11}{15} \end{array}$$

2.  $10 + \left(-3\frac{3}{8}\right)$

$$6\frac{5}{8}$$

$$\begin{array}{r} 9\frac{8}{8} \\ -3\frac{3}{8} \\ \hline 6\frac{5}{8} \end{array}$$

$$\begin{aligned} 10 - 3 &= 7 \\ 7 - \frac{3}{8} &= 6\frac{5}{8} \end{aligned}$$

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3.  $\frac{1}{5} + 20.3 + \left(+5\frac{3}{5}\right)$   $26.1$

$\frac{1}{5} + 5\frac{3}{5} + 20.3$   
 $5\frac{4}{5} + 20.3$   
 $5.8 + 20.3$

4.  $\frac{11}{12} - (-10) - \frac{5}{6}$

$\frac{11}{12} + 10 - \frac{5}{6}$

$\frac{11}{12} + \left(-\frac{5}{6} \times 2\right) + 10$

$\frac{11}{12} + \left(-\frac{10}{12}\right) + 10$

$\frac{1}{12} + 10 = 10\frac{1}{12}$

$\frac{4}{5} = \frac{8}{10}$   $\frac{5.8}{26.1}$

$10 \quad 26\frac{1}{10}$   
 $26.1$

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$3\frac{1}{5} + -5\frac{2}{4}$

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

$3 + (-5) + \frac{1 \times 4}{5 \times 4} + \frac{-2 \times 5}{4 \times 5}$

$-2 + \frac{4}{20} + \left(-\frac{10}{20}\right)$

$-2 + \frac{-6}{20}$

$-2\frac{6}{20} \div 2 = -2\frac{3}{10}$

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5. Explain step by step, how to arrive at a single rational number to represent the following expression. Show both a written explanation and the related math work for each step.

$$1 - \frac{3}{4} + (-12\frac{1}{4})$$

$$1 - \frac{3}{4} - 12 + (-\frac{1}{4})$$

$$1 + (-\frac{3}{4}) + (-\frac{1}{4}) + (-12)$$

$$1 + (-1) + (-12)$$

$$0$$

12

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Oct 28-3:41 PM