Chapter 3: Rational Numbers



Learning Outcomes:

* Comparing and ordering rational numbers
* Adding and subtracting rational numbers
* Multiplying and dividing rational numbers
* Solving problems that involve multiple operations (BEDMAS)
* Solving word problems that involve rational numbers

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3.1 What is a Rational Number?

A rational number is any number that can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the form \_\_

where n≠0.

examples:

For every positive fraction, there is a corresponding \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Every fraction can be written as a decimal:

example:

 2

We can use a number line to visualize rational numbers:

example:

1. , , , , , 2
2. , , , -1, ,

To order these rational numbers we need to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Step 1:

Step 2:

Order:

**Negative Fractions:**

\_\_\_ \_\_\_ \_\_\_ all mean the same thing.

However, when we write a fraction, always write the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Writing a rational number between two given numbers:**

Write 2 numbers between:

1. 1.4 and 1.5 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. -0.25 and -0.26 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Ordering numbers in fraction or decimal form:**

Order the following sets of rational numbers from least to greatest

1. 
2. 
3. 
	1. **Worksheet**

1. Write each rational number as a decimal.

1. = \_\_\_\_\_
2. = \_\_\_\_\_
3. = \_\_\_\_\_
4. = \_\_\_\_\_
5. - = \_\_\_\_\_
6. - = \_\_\_\_\_

2. Plot each pair on a number line and circle the larger rational number.

1. 4 and 4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. and - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. -5 and -5 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Find 2 rational numbers between each pair of numbers.

1. -2.1 and -1.7 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. 4.1 and 4.4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. -1 and -2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Order these rational number from least to greatest:

, , -1.7, -2,

From least to greatest: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. Kiki recorded the temperatures at the same time each day over a 5-day period.

-0.8°C, -1.3°C, 2.4°C, -1.5°C, 0.9°C

Order the temperatures from lowest to highest:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3.2 Addition & Subtraction of Rational Numbers

To add or subtract rational numbers in fraction form you must use a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Example: evaluate the following

1. + =
2. + =
3. - () – (-1) =
4. – (-2) + (-3 ) =

Decimals:

1. – 3.1 + 1.2 =
2. -9.7 – 10.13
3. 28.17 – 39.72

3.2 Worksheet

1. Add the following:

**a) i)** 4+ 6 = \_\_\_\_\_\_\_ **ii)** 4.1 + 6.4 = \_\_\_\_\_\_\_ **iii)** + = \_\_\_\_\_\_\_

**b) i)** 4+ (-6) = \_\_\_\_\_\_\_ **ii)** 4.1 + (-6.4) = \_\_\_\_\_\_\_ **iii)** + (-) = \_\_\_\_\_\_\_

**c) i)** -4+ 6 = \_\_\_\_\_\_\_ **ii)** -4.1 + 6.4 = \_\_\_\_\_\_\_ **iii)** - + = \_\_\_\_\_\_\_

**d) i)** -4+ (-6) = \_\_\_\_\_\_\_ **ii)** -4.1 + (-6.4) = \_\_\_\_\_\_\_ **iii)** - + (-) = \_\_\_\_\_\_\_

2. Find each sum.

a) -4.6 + 5.8 = \_\_\_\_\_\_\_

b) 2.3 + (-4.6) = \_\_\_\_\_\_\_

c) -0.3 + (-6.2) = \_\_\_\_\_\_\_

d) (-26.5) + (-18.1) = \_\_\_\_\_\_\_

3. Find each sum.

a) - + = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) + (- ) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) - + (- ) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Find each sum (look for a common denominator first!)

a) -2 + 6

b) -1 + (-3 )

c) (-3 ) + (-5 )

**3.1 – 3.2 Rational Numbers**

**Extra Practice Review Worksheet**

*Show all of your work!*

1. Write in decimal form.
2. List these rational numbers, from least to greatest.
3. Determine each sum.
4. Determine each difference.
5. Simplify.

**Adding and Subtracting Rational Numbers Worksheet**

Try the first 5 questions from each section. When you are done please check your answer. If you have done all 5 correctly with proper work show to justify your answer you may go on to the next section and repeat the process. If you are not able to complete all 5 correctly please try another 5 questions in the same section and get them checked. Complete as many as possible. If you get to section D please do as many of the questions as you can.

**!DO ALL WORK ON A SEPARATE PIECE OF PAPER!**

**Section A:**

1.  2.  3. 

4.  5. 

6.  7.  8. 

9.  10. 

11.  12.  13. 

14.  15. 

**Section B:**

1.  2.  3. 

4.  5. 

6.  7.  8. 

9.  10. 

11.  12.  13. 

14.  15. 

**Section C:**

1.  2.  3. 

4.  5. 

6.  7.  8. 

9.  10. 

11.  12.  13. 

14.  15. 

**Section D:**

1. **** 2. **** 3. ****

4. **** 5. **** 6. ****

7.  8.  9. 

10.  11.  12. 

13.  14.  15. 

16.  17.  18. 

19.  20.  21. 

22.  23.  24. 

25.  26.  27. 

3.3 & 3.4 Multiplying & Dividing Rational Numbers

Rules for multiplying:

( - )( - ) = ( + )

 ( - )( + ) = ( - )

 ( + )( - ) = ( - )

 ( - )( - ) = ( + )

\*Same sign = +

\*Different sign = -

 x =

Example: simplify

1.

2.

3.

4. 2

Simplify completely (reduce first)

5.

6. 2

7.

Multiplying Decimals

a) 3.2 x 0.17

b) 260 x (-0.04)

Division is the opposite of multiplication but the rules \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. To divide you must \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Examples: simplify

1. (-)

2.

3. (-) )

Example: divide the decimals

1. -8.4 (-4)
2. 3.15
3. 0.25

Example:

Susie has 2 cups of water. She pours cup in a glass. How many glasses can she fill?

3.3 & 3.4 Worksheet

1. Is the product positive or negative?

a) (-2.5) x 3.6 \_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) (-4.1) x (-6.8) \_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) ()() \_\_\_\_\_\_\_\_\_\_\_\_\_\_

d) (-2) x 6 \_\_\_\_\_\_\_\_\_\_\_\_

2. Find each product.

a) x = b) () x () =

c) () x 1 = d) (-2) x -1

3. Multiply the following decimals

a) 0.4 x (-3.2) = b) (-3.03) x (-0.7) =

1. Find each quotient
2.
3.
4.
5.
6. Use integers to determine each quotient
7. (-2.94) 0.7
8. (-5.52) (-0.8)

**3.3 – 3.4 Rational Numbers**

**Extra Practice Review Worksheet**

*Show all of your work!*

1. Evaluate.
2. Evaluate. *Do not use a calculator!*
3. Evaluate.
4. Evaluate. *Do not use a calculator!*
5. Solve for 🞏.

3.5 Order of Operations with Rational Numbers (BEDMAS)

Example: simplify

1. 3 (-2 + 6) – 5(4-1)
2. -8 – 2(24 (-8))2
3. + x
4. x [ + ]

1. ()()() + ()
2. + ()()
3. +

3.5 Worksheet

1. In each expression, which operation should you do first?
	1. (-8.6) x 2.4 – (-6 + 2.5) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. 2.5 – 6.4 x 2.1 + 3.5 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. x + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	4. + - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Evaluate each expression
	1. (-3.6) 1.8 + (1.2 – 1.5)
	2. ()2
3. Evaluate each expression.
	1. (5.6 + 4.4) (-2.5)
	2. (-4.2) + 6 x (-1.7)
	3. 9.2 ÷ 4 – 3.6 x 2
	4. 7.5 x [-0.7 + (-0.3) x 3]
	5. + x
	6. ÷ +
4. A mistake was made in each solution.

Identify the line in which the mistake was made, and give the correct solution.

1. (-3.2 ÷ 1.6)2 – (-4.1) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

= (-2)2 – (-4.1) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

= 4 + (-4.1) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

= -0.1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. + x () \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

= x \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**3.5 Order of Operation with Rational Numbers**

**Extra Practice Review Worksheet**

*Show all of your work!*

1. Evaluate.

2. Evaluate. *Do not use a calculator!*