

Eureka Math™ Homework Helper

2015–2016

Grade 6 Module 3 *Lessons 1–13*

Eureka Math, A Story of Ratios®

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G6-M3-Lesson 1: Positive and Negative Numbers on the Number Line—Opposite Direction and Value

- Draw a number line, and create a scale for the number line in order to plot the points -1 , 3 , and 5 .
 - Graph each point and its opposite on the number line.
 - Explain how you found the opposite of each point.



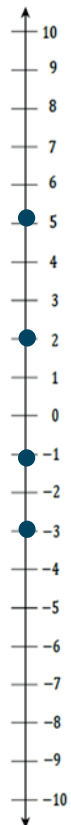
I know that opposite numbers are the same distance from zero, except in opposite directions.

To graph each point, start at zero, and move right or left based on the sign and number (to the right for a positive number and to the left for a negative number). To graph the opposites, start at zero, but this time move in the opposite direction the same number of times.

- Kip uses a vertical number line to graph the points -3 , -1 , 2 , and 5 . He notices -3 is closer to zero than -1 . He is not sure about his diagram. Use what you know about a vertical number line to determine if Kip made a mistake or not. Support your explanation with a vertical number line diagram.

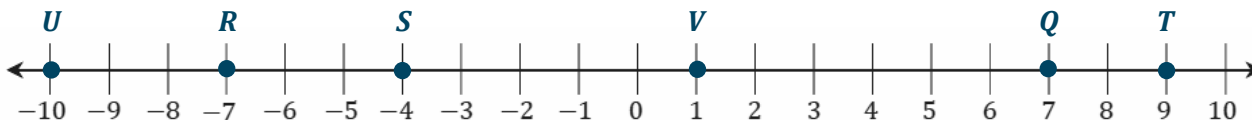
Kip made a mistake because -3 is less than -1 , so it should be farther down the number line. Starting at zero, negative numbers decrease as we look farther below zero. So, -1 lies before -3 since -1 is 1 unit below zero, and -3 is three units below zero.

I know that values increase as I look up on a vertical number line and decrease as I look down. Numbers above zero are positive, and numbers below zero are negative.



3. Create a scale in order to graph the numbers -10 through 10 on a number line. What does each tick mark represent?

Each tick mark represents one unit.



4. Choose an integer between -4 and -9 . Label it R on the number line created in Problem 3, and complete the following tasks.

Answers will vary. Answers a-e reflect the student choice of -7 . -7 is between -4 and -9 .

- a. What is the opposite of R ? Label it Q .

The opposite of -7 is 7 .

- b. State a positive integer greater than Q . Label it T .

A positive integer greater than 7 is 9 because 9 is farther to the right on the number line.

- c. State a negative integer greater than R . Label it S .

A negative integer greater than -7 is -4 because -4 is farther to the right on the number line.

- d. State a negative integer less than R . Label it U .

A negative integer less than -7 is -10 because -10 is farther to the left on the number line.

- e. State an integer between R and Q . Label it V .

An integer between -7 and 7 is 1 .

5. Will the opposite of a positive number always, sometimes, or never be a positive number? Explain your reasoning.

The opposite of a positive number will never be a positive number. For two nonzero numbers to be opposite, zero has to be between both numbers, and the distance from zero to one number has to equal the distance between zero and the other number.

6. Will the opposite of zero always, sometimes, or never be zero? Explain your reasoning.

The opposite of zero will always be zero because zero is its own opposite.

7. Will the opposite of a number always, sometimes, or never be greater than the number itself? Explain your reasoning. Provide an example to support your reasoning.

The opposite of a number will sometimes be greater than the number itself because it depends on the given number. The opposite of a negative number is a positive number, so the opposite will be greater. But, the opposite of a positive number is a negative number, which is not greater. Also, if the number given is zero, then the opposite is zero, which is never greater than itself.

G6-M3-Lesson 2: Real-World Positive and Negative Numbers and Zero

1. Express each situation as an integer in the space provided.

- a. A gain of 45 points in a game

45

- b. A fee charged of \$3

-3

- c. A temperature of 20 degrees Celsius below zero

-20

- d. A 35-yard loss in a football game

-35

- e. A \$15,000 deposit

15,000

I know words that imply a positive magnitude include “gain” and “deposit.” Words that imply a negative magnitude include “fee charged,” “below zero,” and “loss.”

2. Each sentence is stated *incorrectly*. Rewrite the sentence to correctly describe each situation.

- a. The temperature is -20 degrees Fahrenheit below zero.

The temperature is 20 degrees Fahrenheit below zero. Or, the temperature is -20 degrees Fahrenheit.

- b. The temperature is -32 degrees Celsius below zero.

The temperature is 32 degrees Celsius below zero. Or, the temperature is -32 degrees Celsius.

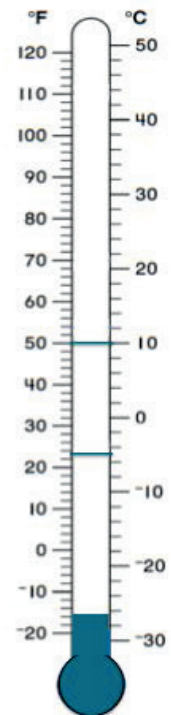
I know that magnitude can be determined by the use of language in a problem. "Below zero" means that the number being referenced will be negative, so I do not need to use a negative sign. Or, if I choose to use a negative sign, I do not need the term "below zero" because the number is already negative.

For Problems 3–5, use the thermometer to the right.

3. Mark the integer on the thermometer that corresponds to the temperature given.

- a. 50°F
b. -5°C

The Fahrenheit scale is on the left of the thermometer, and the Celsius scale is on the right. I need to mark the integers on the correct scale.



4. The melting point of steel is $1,510^{\circ}\text{C}$. Can this thermometer be used to record the temperature of the melting point of steel? Explain.

The melting point of steel cannot be represented on this thermometer. The highest this thermometer gauges is 50°C . $1,510^{\circ}\text{C}$ is a much larger value.

5. Natalie shaded the thermometer to represent a temperature of 15 degrees below zero Celsius, as shown in the diagram. Is she correct? Why or why not? If necessary, describe how you would fix Natalie's shading.

Natalie is incorrect. She did shade in -15° but on the wrong scale. The shading represents -15°F , instead of -15°C . To fix Natalie's mistake, the shading must be between -10 and -20 on the Celsius scale.

G6-M3-Lesson 3: Real-World Positive and Negative Numbers and Zero

1. Write an integer to match the following descriptions.

- | | |
|-----------------------------------|---------------|
| a. A debit of \$50 | -50 |
| b. A deposit of \$125 | 125 |
| c. 5,600 feet above sea level | 5,600 |
| d. A temperature increase of 50°F | 50 |
| e. A withdrawal of \$125 | -125 |
| f. 5,600 feet below sea level | -5,600 |

I know words that describe positive integers include “deposit,” “above sea level,” and “increase.” Words that describe negative integers include “debit,” “withdrawal,” and “below sea level.”

For Problems 2 and 3, read each statement about a real-world situation and the two related statements in parts (a) and (b) carefully. Circle the correct way to describe each real-world situation; *possible answers include either (a), (b), or both (a) and (b)*.

2. A shark is 500 feet below the surface of the ocean.

- a. The depth of the shark is 500 feet from the ocean’s surface.
- b. The whale is -500 feet below the surface of the ocean.

To represent a negative integer, I know I can use a negative sign or vocabulary that determines magnitude, but not both.

3. Carl’s body temperature decreased by 3°F.

- a. Carl’s body temperature dropped 3°F.
- b. The integer -3 represents the change in Carl’s body temperature in degrees Fahrenheit.

The word “dropped” tells me the integer is negative. A “decrease” also tells me the integer is negative. I know that -3 represents a negative integer and the change in the temperature, so both of these examples are correct.

4. A credit of \$45 and a debit of \$50 are applied to your bank account.
- What is the appropriate scale to graph a credit of \$45 and a debit of \$50? Explain your reasoning.
Because both numbers are divisible by 5, an interval of 5 is an appropriate scale on a number line.
 - What integer represents “a credit of \$45” if zero represents the original balance? Explain.
45; a credit is greater than zero, and numbers greater than zero are positive numbers.
 - What integer describes “a debit of \$50” if zero represents the original balance? Explain.
−50; a debit is less than zero, and numbers less than zero are negative numbers.
 - Based on your scale, describe the location of both integers on the number line.
If the scale is created with multiples of 5, then 45 would be 9 units to the right (or above) zero, and −50 would be 10 units to the left (or below) zero.
 - What does zero represent in this situation?
Zero represents no change being made to the account balance. No amount is either added to or subtracted from the account.

G6-M3-Lesson 4: The Opposite of a Number

1. Find the opposite of each number, and describe its location on the number line.

a. -4

The opposite of -4 is 4 , which is 4 units to the right of (or above) zero if the scale is one.

b. 8

The opposite of 8 is -8 , which is 8 units to the left of (or below) zero if the scale is one.

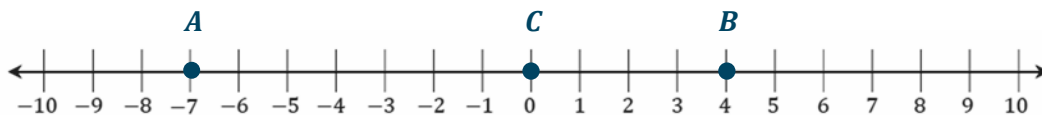
I know the opposite of any integer is on the opposite side of zero at the same distance. Since -4 is 4 units to the left of zero, then 4 units to the right of zero is 4. The opposite of -4 is 4. The opposite of 8 has to be -8 because -8 is the same distance from zero, just to the left.

2. Write the opposite of each number, and label the points on the number line.

a. Point A : the opposite of 7 -7

b. Point B : the opposite of -4 4

c. Point C : the opposite of 0 0



7 is located 7 units to the right of zero, so the opposite of 7 must be 7 units to the left of zero. I know -4 is located 4 units to the left of zero, so its opposite has to be 4 units to the right of zero. I also know that zero is its own opposite.

3. Study the first example. Write the integer that represents the opposite of each real-world situation. In words, write the meaning of the opposite.

a. An atom's negative charge of -9

9, an atom's positive charge of 9

b. A deposit of \$15

-15 , a withdrawal of \$15

c. 2,500 feet below sea level

2,500, 2,500 feet above sea level

d. A rise of 35°C

-35 , a decrease of 35°C

e. A loss of 20 pounds

20, a gain of 20 pounds

I know the following opposites:

negative/positive

deposit/withdrawal

below sea level/above sea level

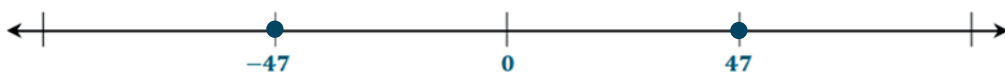
rise/decrease

loss/gain

Using these opposites, I can determine the opposite of the integers in the situations.

4. On a number line, locate and label a credit of \$47 and a debit for the same amount from the bank. What does zero represent in this situation?

Zero represents no change in the balance.



At the beginning of my transactions, my bank account is a fixed number. If I do not change it, then the change is represented with zero. If I have a credit of 47, I know that that is an increase and falls to the right of zero. If I have a debit of 47, I know that that is a decrease and falls to the left of zero.

G6-M3-Lesson 5: The Opposite of a Number's Opposite

1. Read each description carefully, and write an equation that represents the description.

- a. The opposite of negative six

$$-(-6) = 6$$

- b. The opposite of the opposite of thirty-five

$$-(-(35)) = 35$$

The opposite of a negative number is positive because it is on the opposite side of zero on the number line. The opposite of the opposite of a positive number is positive because the first opposite is on the left side of zero on the number line. The next opposite is to the right of zero.

2. Carol graphed the opposite of the opposite of 4 on the number line. First, she graphed point F on the number line 4 units to the right of zero. Next, she graphed the opposite of F on the number line 4 units to the left of zero and labeled it M . Finally, she graphed the opposite of M and labeled it R .



- a. Is her diagram correct? Explain. If the diagram is not correct, explain her error, and correctly locate and label point R .

Yes, her diagram is correct. It shows that F is 4 because it is 4 units to the right of zero. The opposite of 4 is -4 , which is point M (4 units to the left of zero). The opposite of -4 is 4, so point R is 4 units to the right of zero.

- b. Write the relationship between the points.

F and M

They are opposites.

M and R

They are opposites.

F and R

They are the same.

I see that points M and F are exactly the same distance from zero, just in opposite directions, so they are opposites. M and R are also the same distance from zero on opposite sides, so they are also opposites.

3. Read each real-world description. Write the integer that represents the opposite of the opposite. Show your work to support your answer.

- a. A temperature rise of 20 degrees Fahrenheit

-20 is the opposite of 20 (which is a fall in temperature).

20 is the opposite of -20 (which is a rise in temperature).

$$-(-20) = 20$$

I know that the word *rise* describes a positive integer. The opposite of a positive integer is a negative integer. The opposite of negative integer is a positive integer.

- b. A loss of 15 pounds

15 is the opposite of -15 (which is a gain of pounds).

-15 is the opposite of 15 (which is a loss of pounds).

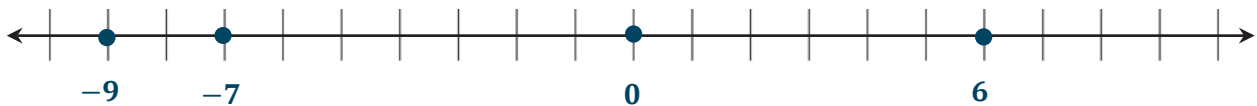
$$-(-15) = 15$$

I know that the word *loss* describes a negative integer. The opposite of a negative integer is a positive integer. The opposite of a positive integer is a negative integer.

4. Write the integer that represents the statement. Locate and label each integer on the number line below. Plot each integer with a point on the number line.

- | | |
|--------------------------------------|-----------|
| a. The opposite of a gain of 7 | -7 |
| b. The opposite of a deposit of \$9 | -9 |
| c. The opposite of the opposite of 0 | 0 |
| d. The opposite of the opposite of 6 | 6 |

I know that the words *gain* and *deposit* describe a positive integer.



G6-M3-Lesson 6: Rational Numbers on the Number Line

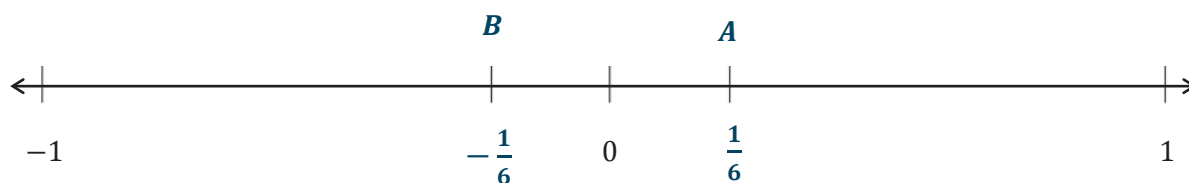
1. In the space provided, write the opposite of each number.

a. $\frac{11}{8}$ $-\frac{11}{8}$

b. $-\frac{7}{4}$ $\frac{7}{4}$

c. 5.67 -5.67

2. Choose a non-integer between 0 and 1. Label it point A and its opposite B on the number line. Write values below the points.



I know integers are numbers that are not fractional. A non-integer is a number that can be a fraction.

a. To draw a scale that would include both points, what could be the length of each segment?

The length of each segment could be $\frac{1}{6}$.

b. In words, create a real-world situation that could represent the number line diagram.

Starting from school, the track is $\frac{1}{6}$ of a mile away. The baseball field is $\frac{1}{6}$ of a mile from the school in exactly the opposite direction.

3. Choose a value for point P that is between -8 and -9 .

$$-\frac{26}{3}$$

I can choose any non-integer less than -8 and more than -9 . This can be a fraction or a decimal.

- a. What is the opposite of P ?

$$\frac{26}{3}$$

- b. Use the value from part (a), and describe its location on the number line in relation to zero.

$\frac{26}{3}$ is the same distance as $-\frac{26}{3}$ from zero but to the right. $\frac{26}{3}$ is $8\frac{2}{3}$ units to the right of (or above) zero.

- c. Find the opposite of the opposite of point P . Show your work and explain your reasoning.

The opposite of the opposite of the number is the original number. If P is located at $-\frac{26}{3}$, then the opposite of the opposite of P is located at $-\frac{26}{3}$. The opposite of $-\frac{26}{3}$ is $\frac{26}{3}$. The opposite of $\frac{26}{3}$ is

$$-\frac{26}{3} \cdot -\left(-\left(-\frac{26}{3}\right)\right) = -\frac{26}{3}$$

4. Locate and label each point on the number line. Use the diagram to answer the questions.

Ami lives one block north of the hair salon.

Trisha's house is $\frac{1}{4}$ of a block past Ami's house.

Isa and Shane are at the soccer field $\frac{6}{4}$ blocks south of the hair salon.

The grocery store is located halfway between the hair salon and the soccer field.

I know that each of the values in the problem has a denominator of 4, so I separated my number line into equal units of $\frac{1}{4}$. From there, I know one whole is $\frac{4}{4}$ to locate Ami's house.



- a. Describe an appropriate scale to show all the points in the situation.

An appropriate scale would be $\frac{1}{4}$ because the numbers given in the example all have denominators of 4. I would divide the number line by equal segments of $\frac{1}{4}$.

- b. What number represents the location of the grocery store? Explain your reasoning.

The number is $-\frac{3}{4}$. I found the location of the soccer field, which is 6 units below zero. Half of 6 is 3, so I moved down 3 units from zero.

G6-M3-Lesson 7: Ordering Integers and Other Rational Numbers

1. In the table below, list each set of rational numbers in order from least to greatest. Then, list their opposites. Finally, list the opposites in order from least to greatest.

Rational Numbers	Ordered from Least to Greatest	Opposites	Opposites Ordered from Least to Greatest
$-6.1, -6.35$	$-6.35, -6.1$	$6.35, 6.1$	$6.1, 6.35$
$\frac{1}{3}, -\frac{1}{4}$	$-\frac{1}{4}, \frac{1}{3}$	$\frac{1}{4}, -\frac{1}{3}$	$-\frac{1}{3}, \frac{1}{4}$
$-49.9, -50$	$-50, -49.9$	$50, 49.9$	$49.9, 50$
$32\frac{1}{3}, 32$	$32, 32\frac{1}{3}$	$-32, -32\frac{1}{3}$	$-32\frac{1}{3}, -32$
$65.03, 65.05$	$65.03, 65.05$	$-65.03, -65.05$	$-65.05, -65.03$

I can visualize a number line to order the rational numbers from least to greatest. The number farthest to the left on the number line is the least, and the number to the right is the greatest.

2. For each row, what pattern do you notice between the numbers in the second and fourth columns? Why is this so?

For each row, the numbers in the second and fourth columns are opposites, and their order is opposite. This is because on the number line, as you move to the right, numbers increase. But as you move to the left, numbers decrease.

G6-M3-Lesson 8: Ordering Integers and Other Rational Numbers

1. In the table below, list each set of rational numbers in order from greatest to least. Then, in the appropriate column, state which number was farthest right and which number was farthest left on the number line.

Column 1	Column 2	Column 3	Column 4
Rational Numbers	Ordered from Greatest to Least	Farthest Right on the Number Line	Farthest Left on the Number Line
$-2.85, -4.15$	$-2.85, -4.15$	-2.85	-4.15
$\frac{1}{3}, -3$	$\frac{1}{3}, -3$	$\frac{1}{3}$	-3
$0.04, 0.4$	$0.4, 0.04$	0.4	0.04
$0, -\frac{1}{3}, -\frac{2}{3}$	$0, -\frac{1}{3}, -\frac{2}{3}$	0	$-\frac{2}{3}$

I can visualize a number line to order the rational numbers from greatest to least. The number farthest to the right on the number line is the greatest. The number farthest to the left is the least number.

- a. For each row, describe the relationship between the number in Column 3 and its order in Column 2. Why is this?

The number in Column 3 is the first number listed in Column 2. Since it is the farthest right number on the number line, it will be the greatest; therefore, it comes first when ordering the numbers from greatest to least.

- b. For each row, describe the relationship between the number in Column 4 and its order in Column 2. Why is this?

The number in Column 4 is the last number listed in Column 2. Since it is farthest left on the number line, it will be the least; therefore, it comes last when ordering from greatest to least.

2. If two rational numbers, a and b , are ordered such that a is less than b , then what must be true about the order of their opposites: $-a$ and $-b$?

The order will be reversed for the opposites, which means $-a$ is greater than $-b$.

3. Read each statement, and then write a statement relating the *opposites* of each of the given numbers.

- a. 8 is greater than 7.

-8 is less than -7 .

- b. 48.1 is greater than 40.

-48.1 is less than -40 .

I notice that the order is reversed for the opposites.

- c. $-\frac{1}{2}$ is less than $-\frac{1}{6}$.

$\frac{1}{2}$ is greater than $\frac{1}{6}$.

4. Order the following from least to greatest: $-8, -17, 0, \frac{1}{2}, \frac{1}{4}$.

$-17, -8, 0, \frac{1}{4}, \frac{1}{2}$

When I order from least to greatest, I think about the number that is farthest left on the number line. When I order from greatest to least, I start with the number farthest to the right on the number line.

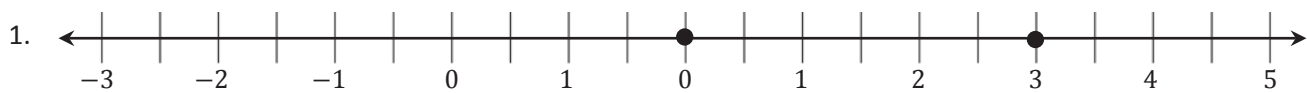
5. Order the following from greatest to least: $-14, 14, -20, 2\frac{1}{2}, 7$.

$14, 7, 2\frac{1}{2}, -14, -20$

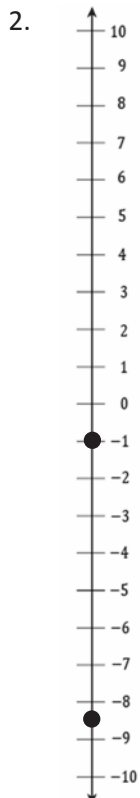
G6-M3-Lesson 9: Comparing Integers and Other Rational Numbers

Numbers

Write a story related to the points shown in each group. Be sure to include a statement relating the numbers graphed on the number line to their order.



Julia did not improve on her Sprint yesterday. Today, she improved her score by three points. Zero represents earning no improvement points yesterday, and 3 represents earning 3 improvement points. Zero is graphed to the left of 3 on the number line. Zero is less than 3.



A turtle is swimming one foot below the surface of the water. An eel is swimming $8\frac{1}{2}$ feet below the water's surface. $-8\frac{1}{2}$ is farther below zero than -1 , so the eel is swimming deeper than the turtle.

I know that as numbers are farther down a vertical number line, the values of the numbers decrease. The greater of two numbers is the number that is farthest up.

G6-M3-Lesson 10: Writing and Interpreting Inequality

Statements Involving Rational Numbers

For each of the relationships described below, write an inequality that relates the rational numbers.

1. Ten feet below sea level is farther below sea level than $5\frac{1}{4}$ feet below sea level.

$$-10 < -5\frac{1}{4}$$

2. Kelly's grades on her last three tests were 85, 90, and $75\frac{1}{2}$. A score of $75\frac{1}{2}$ is worse than a score of 85. A score of 85 is worse than a score of 90.

$$75\frac{1}{2} < 85 < 90$$

For each of the following, use the information given by the inequality to describe the relative position of the numbers on a horizontal number line.

3. $-3.4 < 0 < 3.2$

-3.4 is to the left of zero, and zero is to the left of 3.2 ; or 3.2 is to the right of zero, and zero is to the right of -3.4 .

4. $-5.7 < -5\frac{1}{2} < -5$

-5.7 is to the left of $-5\frac{1}{2}$, and $-5\frac{1}{2}$ is to the left of -5 ; or -5 is to the right of $-5\frac{1}{2}$, and $-5\frac{1}{2}$ is to the right of -5.7 .

Fill in the blanks with numbers that correctly complete each of the statements.

5. Three integers between -5 and -1

$-4, -3, -2$

6. Three rational numbers between -3 and -4

$-3.45, -3.6, -3.99$

Any rational number between -3 and -4 is acceptable.

G6-M3-Lesson 11: Absolute Value—Magnitude and Distance

1. For the following two quantities, which has the greater magnitude? (Use absolute value to defend your answers.)

–13.6 pounds and –13.68 pounds

$$|-13.6| = 13.6 \quad |-13.68| = 13.68$$

13.6 < 13.68, so –13.68 has the greater magnitude.

I can find the absolute value of both numbers and compare. The *magnitude* of a measurement is the absolute value of its measure.

2. Find the absolute value of the numbers below.

a. $|8| =$

b. $|-96.2| =$

c. $|0| =$

In part (a), 8 is 8 units from 0, so the absolute value of 8 is 8. –96.2 is 96.2 units from 0, so its absolute value is 96.2. The absolute value of 0 is 0 and is neither positive nor negative.

a. $|8| = 8$

b. $|-96.2| = 96.2$

c. $|0| = 0$

3. Write a word problem whose solution is $|150| = 150$.

Answers will vary. Kendra went hiking and was 150 feet above sea level.

If sea level is the reference point, I know a positive number (150) will represent a number above sea level, and a negative number (–80) will represent a number below sea level.

4. Write a word problem whose solution is $|-80| = 80$.

Answers will vary. Kristen went scuba diving and was 80 feet below sea level.

G6-M3-Lesson 12: The Relationship Between Absolute Value and Order

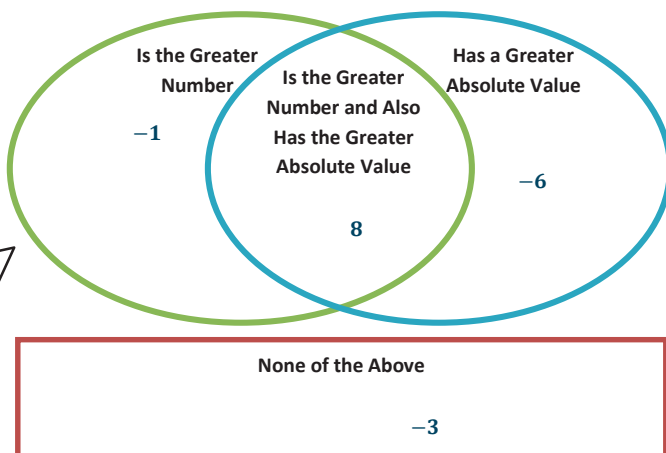
1. Jessie and Makayla each have a set of five rational numbers. Although their sets are not the same, their sets of numbers have absolute values that are the same. Show an example of what Jessie and Makayla could have for numbers. Give the sets in order and the absolute values in order.

Examples may vary. If Jessie had 2, 4, 6, 8, 10, then her order of absolute values would be the same: 2, 4, 6, 8, 10. If Makayla had the numbers $-10, -8, -6, -4, -2$, then her order of absolute values would also be 2, 4, 6, 8, 10.

Since the absolute value of a number is the distance between the number and zero on the number line, it is always a positive value. A number and its opposite have the same absolute value, so I can use any five rational numbers for Jessie's list and their opposites for Makayla's list. To put the numbers in Makayla's list in order, I remember to think of where those numbers are on the number line.

2. For each pair of rational numbers below, place each number in the Venn diagram based on how it compares to the other.

- a. $-6, -1$
b. $8, -3$



In part (a), I know -1 is greater than -6 since it's closer to 0 on the number line. I know -6 has the greater absolute value because it has a greater distance from zero. For part (b), 8 is greater than -3 and also has the larger absolute value. I can place -3 in the *None of the Above* section since it does not fit into any of the three sections of the Venn diagram.

G6-M3-Lesson 13: Statements of Order in the Real World

1. Amy's bank account statement shows the transactions below. Write rational numbers to represent each transaction, and then order the rational numbers from greatest to least.

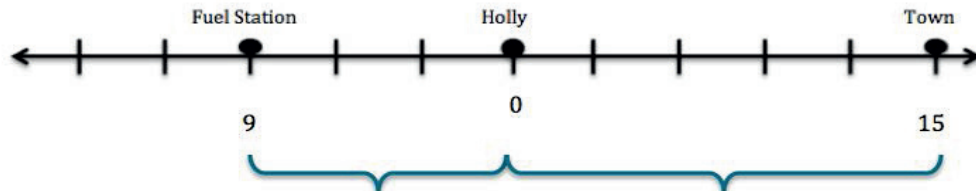
Listed Transactions	Debit \$17.84	Credit \$9.98	Charge \$5.50	Withdrawal \$35.00	Deposit \$11.50	Debit \$6.75	Charge \$9.00
Change to Amy's Account	-17.84	9.98	-5.5	-35	11.5	-6.75	-9

$$11.5 > 9.98 > -5.5 > -6.75 > -9 > -17.84 > -35$$

I visualize the number line to help me determine the placement of the numbers in relation to zero.

The words "debit," "charge," and "withdrawal" all describe transactions in which money is taken out of Amy's account, decreasing its balance. I represent these transactions with negative numbers. The words "credit" and "deposit" describe transactions that will put money into Amy's account, increasing its balance, so I represent these transactions with positive numbers.

2. The fuel gauge in Holly's car says she has 29 miles to go until the tank is empty. She passed a fuel station 9 miles ago, and a sign says there is a town 15 miles ahead. If she takes a chance and drives ahead to the town and there isn't a fuel station, does she have enough fuel to go back to the fuel station? Include a diagram along a number line, and use absolute value to find your answer.



No, Holly does not have enough fuel to drive to the town and back to the gas station.

If I start at 0, where Holly is, I can think about the total number of miles from Holly to town and then how many miles it is back to the fuel station. The distance from where Holly is to town is 15 miles; then, to get to the fuel station from town, she would have to go 24 miles, which is calculated by $|15| + |-9| = 15 + 9$. The total distance is $15 + 24$, which is 39 miles. Holly would not have enough gas since she only has enough fuel for 29 miles.

She needs 15 miles worth of gas to get to town, which reduces the distance she is able to go to 14 miles ($29 - 15 = 14$). If she has to turn back and head to the fuel station, the distance is 24 miles which is calculated by $|15| + |-9| = 15 + 9$. Holly would be 10 miles short on fuel. It would be safer to go back to the fuel station without going to the town first.