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Comparing and Ordering Rational Numbers

PART 1

Introduction

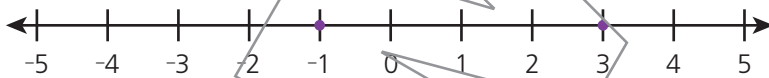
Use a number line to compare numbers or order numbers. When you **compare** numbers, you decide which one is greater than the other. You can use symbols to show how numbers are related.

- is greater than ($>$)
- is greater than or equal to (\geq)
- is less than ($<$)
- is less than or equal to (\leq)
- is equal to ($=$)

What does the statement $-1 < 3$ tell you about the locations of these numbers on a number line?

The $<$ symbol means "is less than," so $-1 < 3$ means "-1 is less than 3."

If -1 is less than 3, then -1 must be to the left of 3 on a number line.

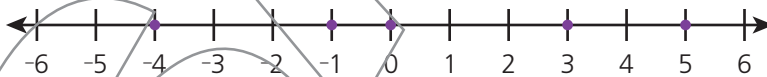


A number is *less than* a number to its right on the number line. A number is *greater than* a number to its left on a number line.

When you **order** numbers, you list them so that the numbers increase or decrease in value.

Use the number line to order -1, 0, 5, -4, and 3 from least to greatest.

Plot each number on the number line. Then read them from left to right.



In order from least to greatest, these numbers are -4, -1, 0, 3, and 5.

More than one $<$ or more than one $>$ can be used in a single inequality statement.

$$-4 < -1 < 0 < 3 < 5$$

$$5 > 3 > 0 > -1 > -4$$

Think About It

Explain why $4 < 5$, but $-4 > -5$.



Focused Instruction

Comparing and ordering numbers can help you understand situations in real life.

► A group of people from cities around the United States recorded the high temperature in degrees Celsius ($^{\circ}\text{C}$) on one day. The high temperatures are listed below.

- Portland: 15°C
- Minneapolis: -2°C
- Boston: 3°C
- New York: 6°C
- Salt Lake City: -8°C
- Cleveland: 4°C
- Dallas: 22°C
- Denver: -3°C
- Chicago: -12°C
- Miami: 34°C
- Buffalo: 0°C
- Philadelphia: 1°C

How can you plot the temperatures on the number line at the right?

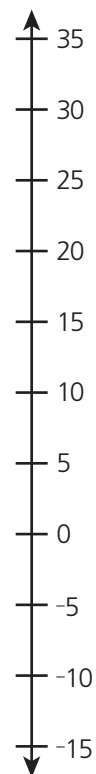
Plot and label the values on the number line.

What does the $<$ symbol mean? _____

When you use the $<$ symbol, what is true about the number to the left of the symbol?

Compare the temperatures in Buffalo and Boston using the $<$ symbol.

Compare the temperatures in Denver and Buffalo using the $<$ symbol.



Positive values are always greater than negative values.

Compare the temperatures in Denver, Boston, and Buffalo using the $<$ symbol.

Order the temperatures from least to greatest. _____

- ▶ A local flower shop recorded profits and losses for each month during the year. The numbers are listed in the table.

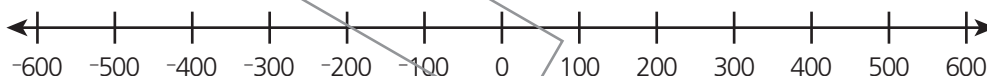
Month	Profit or Loss	Month	Profit or Loss
January	\$180	July	-\$410
February	\$460	August	\$240
March	-\$250	September	\$525
April	-\$575	October	-\$390
May	\$331	November	-\$108
June	\$585	December	\$260

Which type of numbers shows a loss for the month? _____

Which type of numbers shows a profit for the month? _____

A loss means the store did not make money. A profit means the store made money.

Plot the profits and losses on the number line.



What was the shop's greatest profit? _____

What was the shop's greatest loss? _____

Use what you know about comparing and ordering numbers to answer these questions.

1 Write an inequality to compare 2.75 and 2.678. _____

2 Order -2.34, -2.9, -1.06, and -1.8 from least to greatest.

Solve the following problems.

- 1** Write an integer that is greater than -53 but less than -49 .

Answer _____

First, think of what integers are greater than -53 . Then think of the ones that are also less than -49 .

- 2** The balance amounts in a small business bank account for the month of May are shown in the table below.

Day	Balance (\$)
May 1	-83
May 3	-235
May 4	55
May 6	-181
May 13	-64
May 20	-152
May 24	-40
May 26	225

- Part A** Which days had a balance greater than on May 1?

Answer _____

How can you tell if a number is larger or smaller than -83 ?

- Part B** For the days May 20, May 24, and May 26, list the balance amounts, in dollars, in order from greatest to least. Explain how you can use the number line below to help you find your answer.



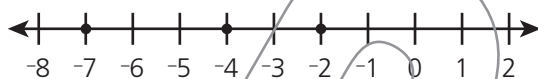
When using a number line, count by 1s, 2s, 5s, 10s, or any number that helps you to compare the values.

Solve the following problems.

- 1 Abby scored -4 in a game. Trudy scored 3 , Melanie scored -5 , and Gia scored -2 . Who received the score with the lowest value?

- A Abby
- B Trudy
- C Melanie
- D Gia

- 2 Use this number line to help answer the question.



Which inequality statement is true?

- A $-7 < -4 < -2$
 - B $-7 > -4 > -2$
 - C $-4 < -7 < -2$
 - D $-4 > -7 > -2$
- 3 The temperature at 1:00 was -7° . At 4:00, it was -12° . At 6:00, it was -9° . Which statement is true?
- A It was warmer at 1:00 than at 4:00.
 - B It was warmer at 4:00 than at 6:00.
 - C It was colder at 1:00 than at 4:00.
 - D It was colder at 6:00 than at 4:00.
- 4 Why is it true that $20.6 > 10.9$, but $-20.6 < -10.9$? Explain.

5 Which of the following are true comparisons of two numbers? Select **all** that apply.

- A** $3.6 < -4.1$
- B** $-3.72 < -8$
- C** $8.39 > 1.46$
- D** $5 > -1.22$
- E** $-6.82 > -2.99$
- F** $7.55 < 4.013$

6 Which sets of integers are ordered from least to greatest? Select **all** that apply.

- A** $-5, 4, -3, 1, 0$
- B** $0, -1, 3, -4, 6$
- C** $7, 4, 0, -3, -5$
- D** $-1, 0, 2, 5, 8$
- E** $5, 4, -3, -6, -9$
- F** $-8, -7, 0, 2, 5$

7 Write the following numbers in their proper places in the table below.

-5 -12 7 0 -8
 6 3 -1 -4 9

Greater Than -3	Less Than -3

- 8 The daily low temperatures in a Montana town one week during the winter are listed below.

-8°F 5°F -3°F 2°F 0°F -6°F 4°F

List these temperatures in order from greatest to least.

Answer _____

- 9 Iris went scuba diving. She recorded the depths of some interesting animals that she saw.

- sea anemone: -11.6 m
- butterflyfish: -8.2 m
- clownfish: -13.4 m
- seahorse: -10.8 m

Place the elevations of the sea animals in the order from greatest to least by writing the name of each animal in the correct order.

Greatest Elevation

Least Elevation

