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Unit 7, Lesson 3: Comparing Positive and Negative Numbers

Let's compare numbers on the number line.

3.1: Which One Doesn't Belong: Inequalities

Which inequality doesn't belong?

$$\frac{5}{4} < 2$$

$$8.5 > 0.95$$

$$8.5 < 7$$

$$10.00 < 100$$

3.2: Comparing Temperatures

Here are the low temperatures, in degrees Celsius, for a week in Anchorage, Alaska.

day	Mon	Tues	Weds	Thurs	Fri	Sat	Sun
temperature	5	-1	-5.5	-2	3	4	0

- Plot the temperatures on a number line. Which day of the week had the lowest low temperature?
- The lowest temperature ever recorded in the United States was -62 degrees Celsius, in Prospect Creek Camp, Alaska. The average temperature on Mars is about -55 degrees Celsius.
 - Which is warmer, the coldest temperature recorded in the USA, or the average temperature on Mars? Explain how you know.
 - Write an inequality to show your answer.

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3. On a winter day the low temperature in Anchorage, Alaska was -21 degrees Celsius and the low temperature in Minneapolis, Minnesota was -14 degrees Celsius.

Jada said: "I know that 14 is less than 21, so -14 is also less than -21 . This means that it was colder in Minneapolis than in Anchorage."

Do you agree? Explain your reasoning.

Are you ready for more?

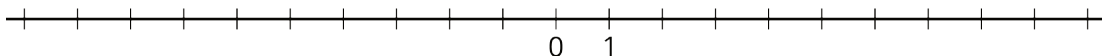
Another temperature scale frequently used in science is the *Kelvin scale*. In this scale, 0 is the lowest possible temperature of anything in the universe, and it is -273.15 degrees in the Celsius scale. Each 1 K is the same as 1°C , so 10 K is the same as -263.15°C .

1. Water boils at 100°C . What is this temperature in K?
2. Ammonia boils at -35.5°C . What is the boiling point of ammonia in K?
3. Explain why only positive numbers (and 0) are needed to record temperature in K.

3.3: Rational Numbers on a Number Line

m.openup.org/1/6-7-3-3

1. Plot the numbers -2 , 4 , -7 , and 10 on the number line. Label each point with its numeric value.



2. Decide whether each inequality statement is true or false. Be prepared to explain your reasoning.

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$-2 < 4$

$-2 < -7$

$4 > -7$

$-7 > 10$

3. Andre says that $\frac{1}{4}$ is less than $-\frac{3}{4}$ because, of the two numbers, $\frac{1}{4}$ is closer to 0. Do you agree? Explain your reasoning.

4. Answer each question. Be prepared to explain how you know.

a. Which number is greater: $\frac{1}{4}$ or $\frac{5}{4}$?

c. Which number is greater: $-\frac{3}{4}$ or $\frac{5}{8}$?

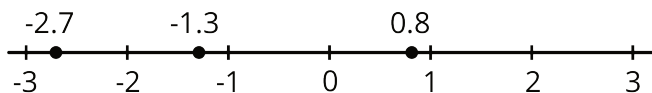
b. Which is farther from 0: $\frac{1}{4}$ or $\frac{5}{4}$?

d. Which is farther from 0: $-\frac{3}{4}$ or $\frac{5}{8}$?

e. Is the number that is farther from 0 always the greater number? Explain your reasoning.

Lesson 3 Summary

We use the words *greater than* and *less than* to compare numbers on the number line. For example, the numbers -2.7, 0.8, and -1.3, are shown on the number line.



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Because -2.7 is to the left of -1.3 , we say that -2.7 is less than -1.3 . We write:

$$-2.7 < -1.3$$

In general, any number that is to the left of a number n is less than n .

We can also see that $0.8 > -1.3$ and $0.8 > -2.7$. In general, any positive number is greater than any negative number.

Lesson 3 Glossary Terms

- sign

We can see that -1.3 is greater than -2.7 because -1.3 is to the right of -2.7 . We write

$$-1.3 > -2.7$$

In general, any number that is to the right of a number n is greater than n

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1. Decide whether each inequality statement is true or false. Explain your reasoning.

a. $-5 > 2$

b. $3 > -8$

c. $-12 > -15$

d. $-12.5 > -12$

2. Here is a true statement: $-8.7 < -8.4$. Select **all** of the statements that are equivalent to $-8.7 < -8.4$.

A. -8.7 is further to the right on the number line than -8.4 .

B. -8.7 is further to the left on the number line than -8.4 .

C. -8.7 is less than -8.4 .

D. -8.7 is greater than -8.4 .

E. -8.4 is less than -8.7 .

F. -8.4 is greater than -8.7 .

3. The table shows five states and the lowest point in each state.

state	lowest elevation (feet)
California	-282
Colorado	3350
Louisiana	-8
New Mexico	2842
Wyoming	3099

Put the states in order by their lowest elevation, from least to greatest.

(from Unit 7, Lesson 4)

