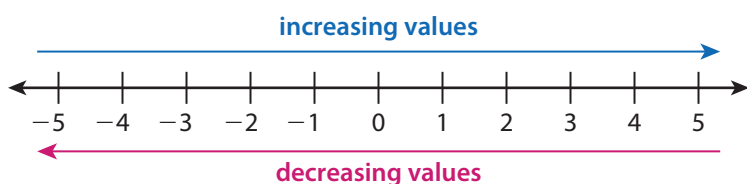# Dear Family,

This week your student is learning how to compare positive and negative numbers. The farther to the left a number is located on a horizontal number line, the lesser the value of that number.

increasing values

−5 −4 −3 −2 −1 0 1 2 3 4 5

decreasing values

You can write an inequality to show which of two numbers has the greater or lesser value. For example, $2 > -3$ means that 2 is greater than −3.

Your student will be learning to solve problems like the one below.

> A town well extends to an elevation of 255 ft below ground level. Jesse's house well extends to an elevation of −260 ft. Which well is deeper?
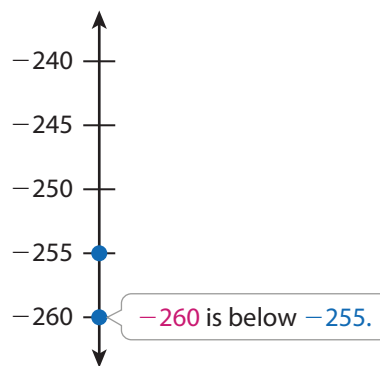
➤ **ONE WAY** to compare the elevations is to use words to describe their relationship in context.
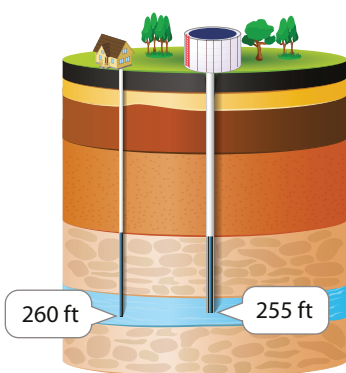
260 ft   255 ft

A point 260 ft underground is deeper than a point 255 ft underground.

➤ **ANOTHER WAY** is to use symbols to write an inequality.

Look at the positions of −260 and −255 on a vertical number line.

−240
−245
−250
−255
−260   −260 is below −255.

$-260 < -255$

Both models show that Jesse's well is deeper than the town well.

Use the next page to start a conversation about positive and negative number comparisons.

Activity Thinking About Comparing Positive and Negative Numbers Around You

DUSTY HILLS GOLF COURSE

SC○RE CARD

Hole	Par	Strokes	Score
1	4	3	−1
2	4	4	−1
3	5	5	−1
4	6	7	0
5	4	6	+2
6	5	5	+2
7	5	6	+3
8	6	6	+3
9	4	5	+4

➤ **Do this activity together to investigate comparing positive and negative numbers in the real world.**

Did you know when you play golf, the lowest score wins? In fact, your final score could even be negative!

A score of −4 means a person used four fewer strokes than was expected in order to complete the golf course. A score of +4 means a person used four more strokes than was expected in order to complete the golf course. Using fewer strokes is better, so a score of −4 is better than +4!

? Where else do you compare positive and negative numbers in the world around you?

Explore Ordering Positive and Negative Numbers

A diagram of a football play

Previously, you learned about positive and negative numbers. In this lesson, you will learn about ordering and comparing positive and negative numbers.

➤ **Use what you know to try to solve the problem below.**

A youth football team tries several different plays. The goal of each play is to gain yards. The coach records the result of each play. List the plays from worst to best.

Name of Play	Wedge	Hook	Flag	Draw	Sweep	Toss
Result: Yards Gained (+) or Lost (−)	−3	+4	−5	+2	0	−4

TRY IT

✏️ **Math Toolkit** algebra tiles, number lines, two-color counters

DISCUSS IT

Ask: What did you do first to decide which play is the worst?

Share: The first thing I did was . . .

◎ **Learning Targets**   SMP 1, SMP 2, SMP 3, SMP 4, SMP 5, SMP 6
- Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
- Write, interpret, and explain statements of order for rational numbers in real-world contexts.

CONNECT IT

**1 Look Back** List the plays from worst to best. Explain how you know.

2 Look Ahead The goal of a football play is to gain yards. The more yards gained or the fewer yards lost, the better the play is. Number lines can be used to help make these types of comparisons with positive and negative numbers.

a. Look at the horizontal number line. Point *D* is farther to the right from 0 than point *C*. Which point represents a greater number?
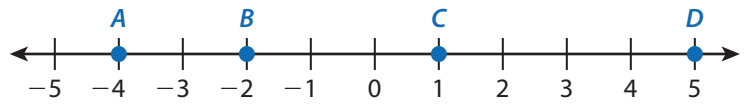
b. Point *A* is farther to the left from 0 than point *B*. Which point represents a greater number?

c. Look at the vertical number line. Point *G* is farther down from 0 than Point *F*. Which point represents a greater number?
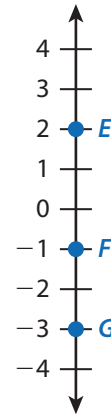
d. Point *E* is above Point *F*. Which point represents a lesser number? What is always true when comparing a negative number and a positive number?

3 Reflect How do the values change on a horizontal number line as you move left? How do the values change on a vertical number line as you move up?

Prepare for Ordering Positive and Negative Numbers

1 Think about what you know about positive and negative numbers. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can.

Word	In My Own Words	Example
positive numbers		
negative numbers		
rational numbers		
inequality		

2 Choose a negative rational number. Write an inequality using the symbol > to compare your number to 0. Explain your thinking.

3 Some friends play history trivia. Players gain 1 point for a correct answer. Players lose 1 point for an incorrect answer. The player with the greatest score wins. The players' scores are shown in the table.

Player	Score
Brett	-7
Ellema	-1
Felipe	$+3$
Jennifer	0
Kamal	$+2$
Riley	-5

a. List the players from worst score to best score. Show your work.

SOLUTION

b. Check your answer to problem 3a. Show your work.

Susan B. Anthony was born in 1820.

Develop Comparing Positive and Negative Numbers

Oshkosh
Current Temperature
2.5°F

Appleton
Current Temperature
−3.5°F

Green Bay
Current Temperature
−5.0°F

➤ **Read and try to solve the problem below.**

On a winter day, Adnan looks up the current temperatures in three nearby cities. Adnan chooses two of the temperatures and writes a comparison. What are all the possible comparisons he can write? You can use words and/or symbols.
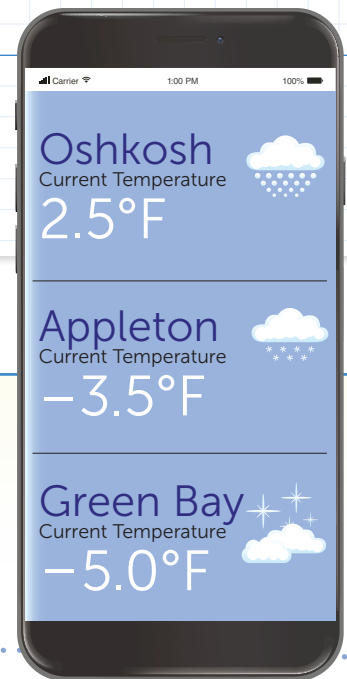
TRY IT

Math Toolkit graph paper, number lines

DISCUSS IT

Ask: How can you determine that you have found all the possible comparisons?

Share: I know I found all the comparisons because . . .

➤ **Explore different ways to compare positive and negative numbers.**

On a winter day, Adnan looks up the current temperatures in three nearby cities. The temperatures are 2.5°F, −3.5°F, and −5°F. Adnan chooses two of the temperatures and writes a comparison. What are all the possible comparisons he can write? You can use words and/or symbols.

Model It

You can use a number line to compare positive and negative numbers.
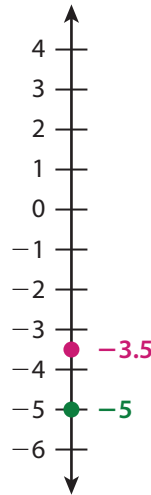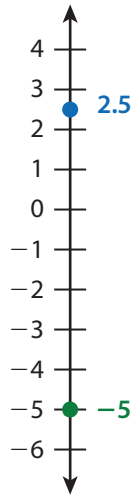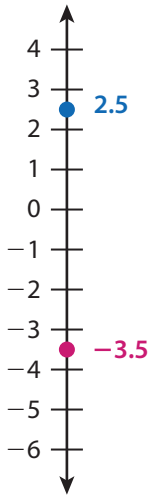
Model It

You can write an inequality to compare positive and negative numbers.

$2.5 > -3.5$ $2.5 > -5$ $-3.5 > -5$

Analyze It

You can use words to interpret the meaning of an inequality in a real-world situation.

2.5°F is warmer than **−3.5°F**.

2.5°F is warmer than **−5°F**.

−3.5°F is warmer than **−5°F**.

CONNECT IT

➤ **Use the problem from the previous page to help you understand how to compare positive and negative numbers.**

1 Look at the two **Model Its**. How can you use a number line to help you write an inequality?

2 Look at **Analyze It**. How can the inequalities help to determine which of two temperatures is warmer?

3 Use the symbol $<$ to rewrite the comparison between $-3.5°F$ and $2.5°F$. Then interpret the meaning of the inequality using the words *colder than*.

4 What are all the possible inequality statements Adnan might write? Use $<$ and $>$.

5 When given a pair of numbers in a real-world situation, how can you compare the numbers using $<$ and $>$? How can an inequality help you interpret the comparison in the real-world situation?

6 **Reflect** Think about all the models and strategies you have discussed today. Describe how one of them helped you better understand how to compare positive and negative numbers.

Apply It

➤ **Use what you learned to solve these problems.**

7 Plot and label the numbers -6.5 and -8.5 on the number line. Then write an inequality using the symbol $>$ to compare the two numbers.
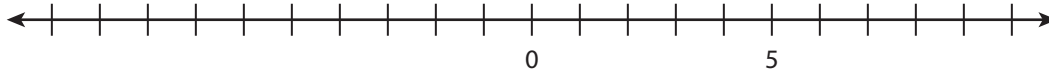
SOLUTION _____

8 Which of the following statements are true? Select all that apply.

A $4 > -17$ because 4 is to the right of -17 on a horizontal number line.

B $4 > -17$ because 4 is to the left of -17 on a horizontal number line.

C $4 > -17$ because -17 is to the right of 4 on a horizontal number line.

D $4 > -17$ because 4 is above -17 on a vertical number line.

E $4 > -17$ because 4 is below -17 on a vertical number line.

F $4 > -17$ because -17 is below 4 on a vertical number line.

9 Notah is studying ocean animals. He learns that the sixgill shark can dive to an elevation of about $-8,200$ ft relative to sea level and the elephant seal can dive to an elevation of about $-7,800$ ft. Write an inequality to compare these elevations. Which animal can dive to a lower elevation? Show your work.
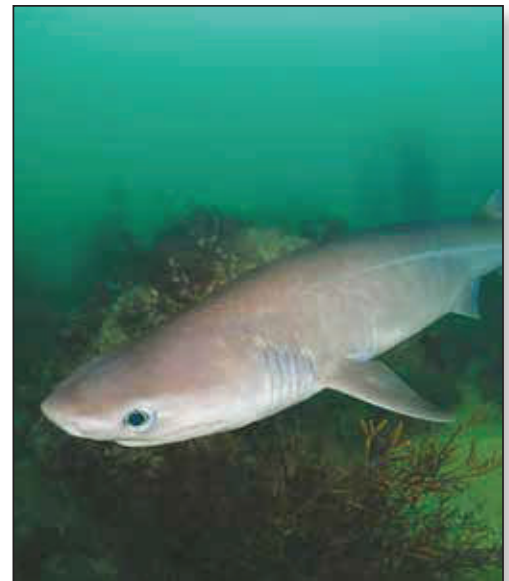
A sixgill shark

SOLUTION _____

_____

# Practice Comparing Positive and Negative Numbers

➤ **Study the Example showing how to compare two negative numbers. Then solve problems 1–5.**

Example

The table shows the amount of money Savanna either withdraws (−) or deposits (+) into her bank account over 5 weeks. Write an inequality to compare the withdrawals for Week 2 and Week 3.

Week	Week 1	Week 2	Week 3	Week 4	Week 5
Amount	+$40	−$40	−$60	+$100	−$80

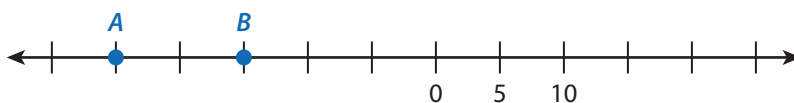Plot the amounts on a number line.
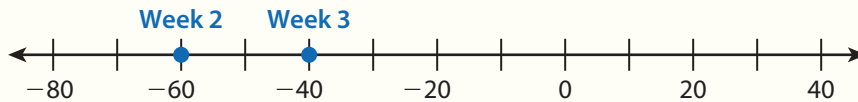
−60 is to the left of −40. So, −60 < −40.

1 **a.** Compare the two amounts in the Example using the symbol >.

b. Does using > for the inequality change which amount represents withdrawing more money? Explain.

2 Write an inequality that compares the value of point A and the value of point B. Show your work.


Vocabulary

inequality
a mathematical statement that uses an inequality symbol to show the relationship between values of expressions.

SOLUTION _____

3 The typical level of a low tide at a beach is the 0 point on a number line. Each day's high and low tides are measured relative to the typical low tide. On Monday morning, low tide is at -0.8 ft. On Tuesday morning, low tide is at -0.4 ft.

typical low tide

0

a. Write an inequality to compare the low tides on Monday and Tuesday mornings. Show your work.
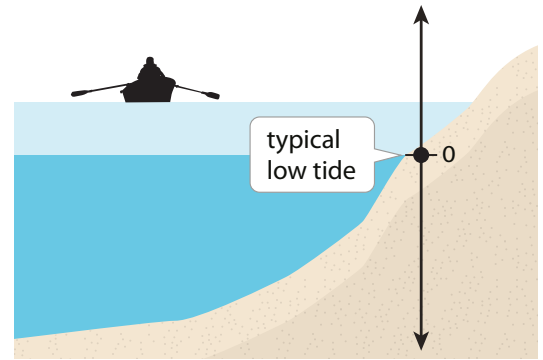
SOLUTION

b. Which day has a higher low tide? Explain.

4 Consider the inequality $-3 < -2\frac{1}{2}$. What does the inequality tell you about the location of -3 compared to the location of $-2\frac{1}{2}$ on a horizontal number line? Use *to the right* and *to the left* in your answer.

5 In golf, the winner is the person with the lowest score. At the end of a round of golf, Jada's score is positive. Isabel's score is negative. Can you determine who wins? If so, tell who wins and why. If not, explain why not.

Refine Ordering Positive and Negative Numbers

➤ **Complete the Example below. Then solve problems 1–9.**

Example

Order the following rational numbers from least to greatest.

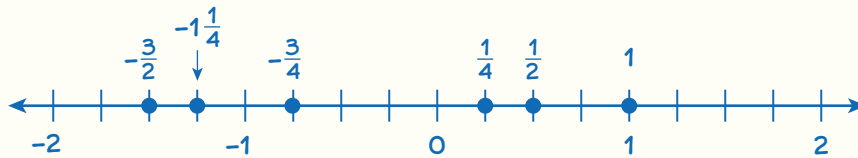$$\frac{1}{4}, -1.25, -\frac{3}{4}, 0.5, 1, -\frac{3}{2}$$

Look at how you could use a number line to order rational numbers.

Write the decimals as fractions.

$$-1.25 = -1\frac{1}{4}$$

$$0.5 = \frac{1}{2}$$

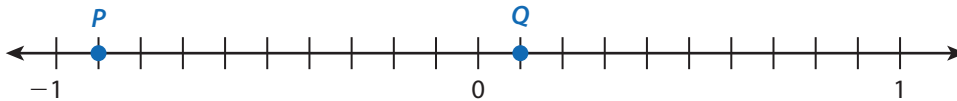**Plot the numbers on a number line.**

SOLUTION _____

Apply It

1 Write two inequalities that compare the value of point P and the value of point Q. Show your work.

SOLUTION _____

2 A vending machine in a cafeteria sells sandwiches. The machine is restocked once during the day. At the end of each day, a cafeteria worker records how many more $(+)$ or fewer $(-)$ sandwiches are in the machine than there were at the start of the day. The table shows the changes for one week.

Day	Change in Number of Sandwiches
Monday	-3
Tuesday	$+4$
Wednesday	-5
Thursday	-2
Friday	0

Write an inequality to compare the changes for Monday and Thursday. Tell what your inequality means in terms of the situation. Show your work.

CONSIDER THIS . . .
The number of sandwiches at the end of a day is the result of some sandwiches being sold and the machine being restocked with more sandwiches.

SOLUTION _____

PAIR/SHARE
What does the 0 in the row for Friday mean in this situation?

3 An elevation of -4 m is higher than an elevation of -8 m. An elevation of -8 m is lower than an elevation of -6 m. Which set of inequalities correctly expresses these relationships?

A $-4 < -8$ and $-8 < -6$

B $-4 < -8$ and $-8 > -6$

C $-4 > -8$ and $-8 < -6$

D $-4 > -8$ and $-8 > -6$

Anders chose B as the correct answer. How might he have gotten that answer?

CONSIDER THIS . . .
How can you plot the elevations on a vertical number line or a horizontal number line to help write the inequalities?

PAIR/SHARE
What is a different way you can write the correct pair of inequalities?

4 Sea level has an elevation of 0 ft. Lake Eyre is the lowest point in Australia. It has an elevation of -15 m relative to sea level. Which of the following U.S. locations, if any, have a lower elevation than Lake Eyre? Explain.
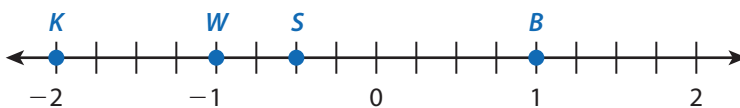
Location	Elevation (m)
Death Valley, California	-86
New Orleans, Louisiana	-2.4
Imperial, California	-18
Ouachita River, Arkansas	17
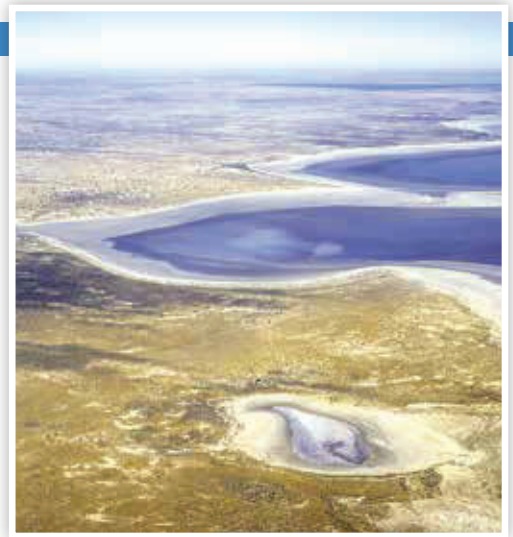
Lake Eyre, Australia

5 Doug says that $-7 > -5$ because $7 > 5$. Do you agree? Explain.

6 Tell whether each statement about the points on the number line is *True* or *False*.

K   W   S   B

-2 -1 0 1 2

	True	False
a. The value of point K is greater than -1.	○	○
b. The value of point B is greater than the value of point W.	○	○
c. The value of point S is less than 1.	○	○
d. The value of point W is less than -0.5.	○	○

7 Order the following rational numbers from least to greatest. Show your work.

$$-1.5, \frac{3}{4}, -\frac{1}{4}, -1.75, -1, 1.5$$

SOLUTION

8 Lilia wants to replace both question marks with the same number so that the inequalities correctly compare the numbers.

$$? > -5 \quad \text{and} \quad ? < 2$$

Which of these numbers could Lilia use? Select all that apply.

A -7 **B** -4

C -2 **D** 0

E 1 **F** 5

9 **Math Journal** Choose two of the rational numbers shown below. Write two inequalities to compare the numbers, using $<$ and $>$. Then describe the location of one number compared to the other on a vertical number line. Use *above* and/or *below* in the description.

$$-\frac{3}{4} \qquad -1.5 \qquad \frac{1}{4} \qquad -1\frac{1}{4} \qquad -0.5$$

✔ **End of Lesson Checklist**

☐ **INTERACTIVE GLOSSARY** Write a new entry for *interpret*. Write at least one synonym for *interpret*.

☐ **SELF CHECK** Go back to the Unit 6 Opener and see what you can check off.