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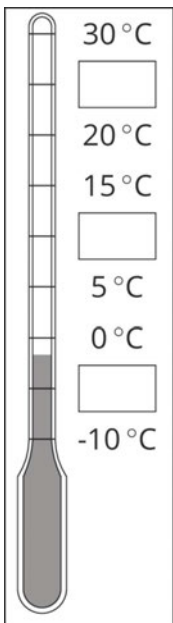
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# Unit 5, Lesson 1: Interpreting Negative Numbers

Let's review what we know about signed numbers.

## 1.1: Using the Thermometer

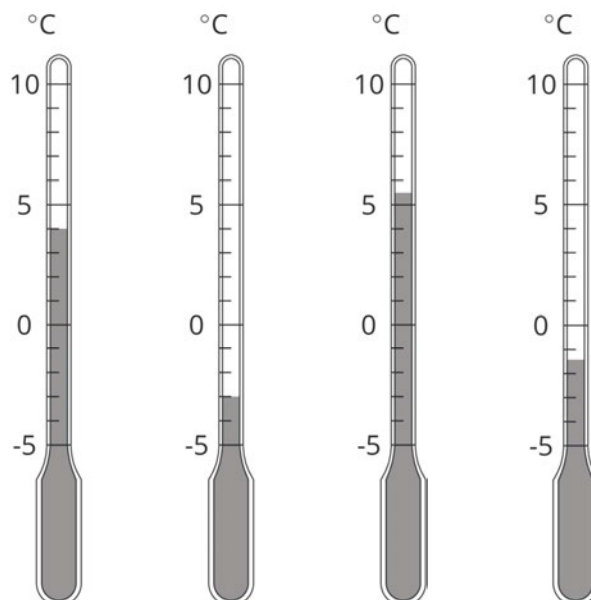
Here is a weather thermometer. Three of the numbers have been left off.



1. What numbers go in the boxes?
2. What temperature does the thermometer show?

## 1.2: Fractions of a Degree

1. What temperature is shown on each thermometer?
2. Which thermometer shows the highest temperature?
3. Which thermometer shows the lowest temperature?
4. Suppose the temperature outside is  $-4^{\circ}\text{C}$ . Is that colder or warmer than the coldest temperature shown? How do you know?



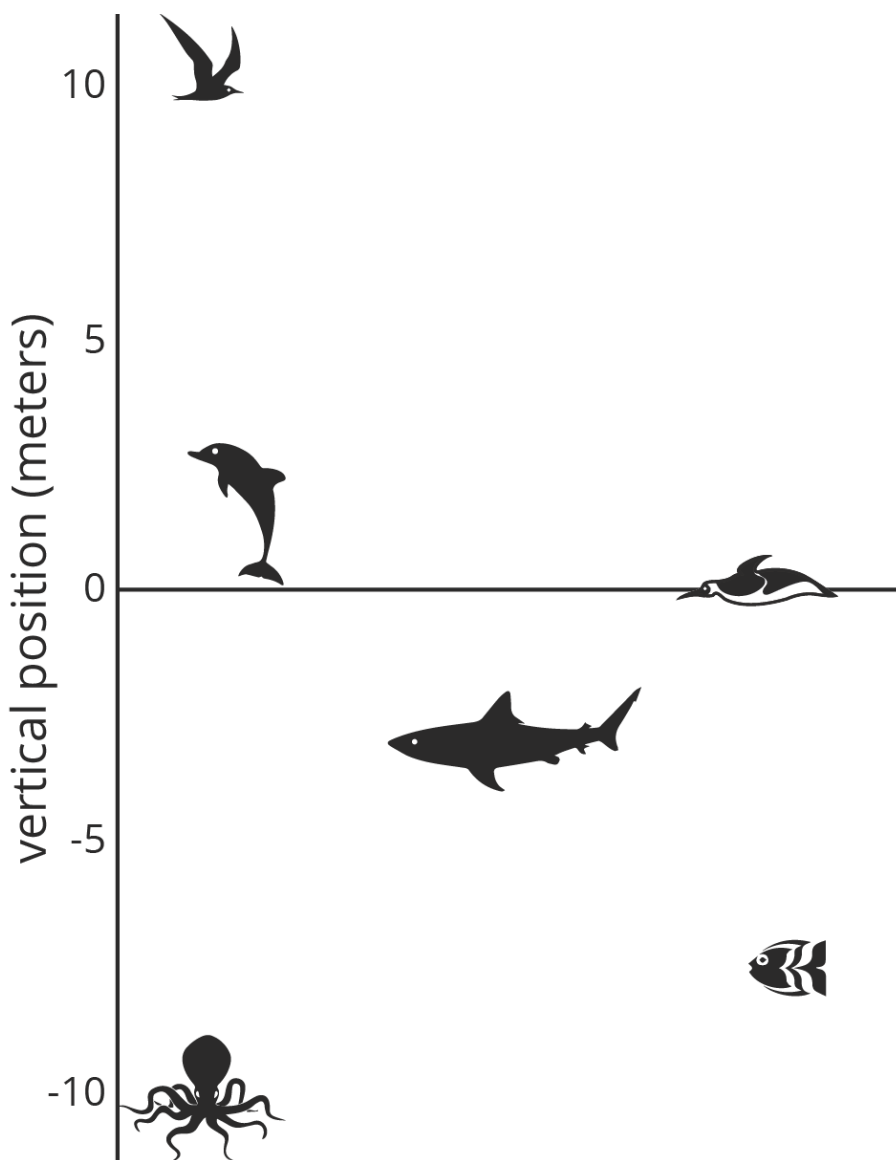
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### 1.3: Seagulls Soar, Sharks Swim

Here is a picture of some sea animals. The number line on the left shows the vertical position of each animal above or below sea level, in meters.



1. How far above or below sea level is each animal? Measure to their eye level.

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2. A mobula ray is 3 meters above the surface of the ocean. How does its distance from the surface of the ocean compare to the vertical distance from the eyes of:

The jumping dolphin?

The flying seagull?

The octopus?

3. An albatross is 5 meters above the surface of the ocean. How does its distance from the surface compare to the vertical distance from the eyes of:

The jumping dolphin?

The flying seagull?

The octopus?

4. A clownfish is 2 meters below the surface of the ocean. How does its distance from the surface compare to the vertical distance from the eyes of:

The jumping dolphin?

The flying seagull?

The octopus?

5. The vertical distance of a new dolphin from the dolphin in the picture is 3 meters. What is its distance from the surface of the ocean?

### Are you ready for more?

The north pole is in the middle of the ocean. A person at sea level at the north pole would be 3,949 miles from the center of the earth. The sea floor below the north pole is at an elevation of approximately -2.7 miles. The elevation of the south pole is about 1.7 miles. How far is a person standing on the south pole from a submarine at the sea floor below the north pole?

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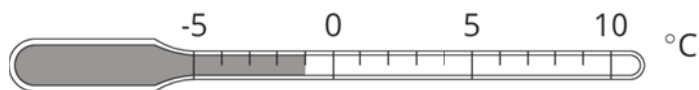
## 1.4: Card Sort: Rational Numbers

1. Your teacher will give your group a set of cards. Order the cards from least to greatest.
2. Pause here so your teacher can review your work. Then, your teacher will give you a second set of cards.
3. Add the new set of cards to the first set so that all of the cards are ordered from least to greatest.

### Lesson 1 Summary

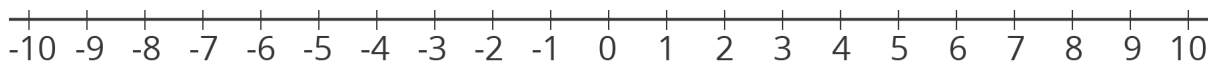
We can use positive and negative numbers to represent temperature and elevation.

When numbers represent temperatures, positive numbers indicate temperatures that are warmer than zero and negative numbers indicate temperatures that are colder than zero. This thermometer shows a temperature of  $-1$  degree Celsius, which we write  $-1^{\circ}\text{C}$ .



When numbers represent elevations, positive numbers indicate positions above sea level and negative numbers indicate positions below sea level.

We can see the order of signed numbers on a number line.



A number is always less than numbers to its right. So  $-7 < -3$ .

We use absolute value to describe how far a number is from 0. The numbers 15 and  $-15$  are both 15 units from 0, so  $|15| = 15$  and  $|-15| = 15$ . We call 15 and  $-15$  *opposites*. They are on opposite sides of 0 on the number line, but the same distance from 0.

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1. It was  $-5^{\circ}\text{C}$  in Copenhagen and  $-12^{\circ}\text{C}$  in Oslo. Which city was colder?

2. a. A fish is 12 meters below the surface of the ocean. What is its elevation?

b. A sea bird is 28 meters above the surface of the ocean. What is its elevation?

c. If the bird is directly above the fish, how far apart are they?

3. Compare using  $>$ ,  $=$ , or  $<$ .

a.  $3$  \_\_\_\_\_  $-3$

f.  $-7.2$  \_\_\_\_\_  $-7$

b.  $12$  \_\_\_\_\_  $24$

g.  $-1.5$  \_\_\_\_\_  $\frac{-3}{2}$

c.  $-12$  \_\_\_\_\_  $-24$

h.  $\frac{-4}{5}$  \_\_\_\_\_  $\frac{-5}{4}$

d.  $5$  \_\_\_\_\_  $-(-5)$

i.  $\frac{-3}{5}$  \_\_\_\_\_  $\frac{-6}{10}$

e.  $7.2$  \_\_\_\_\_  $7$

j.  $\frac{-2}{3}$  \_\_\_\_\_  $\frac{1}{3}$

4. Han wants to buy a \$30 ticket to a game, but the pre-order tickets are sold out. He knows there will be more tickets sold the day of the game, with a markup of 200%. How much should Han expect to pay for the ticket if he buys it the day of the game?

(from Unit 4, Lesson 7)

5. A type of green paint is made by mixing 2 cups of yellow with 3.5 cups of blue.

a. Find a mixture that will make the same shade of green but a smaller amount.

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b. Find a mixture that will make the same shade of green but a larger amount.

c. Find a mixture that will make the different shade of green that is bluer.

d. Find a mixture that will make the different shade of green that is more yellow.

(from Unit 2, Lesson 1)