Ordering Rational Numbers

Let's order rational numbers.

3.1 How Do They Compare?

Use the symbols >, <, or = to compare each pair of numbers. Be prepared to explain your reasoning.

- 12 _____ 19
- 212 _____ 190
- 15 _____ 1.5
- 9.02 _____ 9.2
- 6.050 _____ 6.05
- 0.4 _____ $\frac{9}{40}$
- $\frac{19}{24}$ _____ $\frac{19}{21}$
- $\frac{16}{17}$ _____ $\frac{11}{12}$

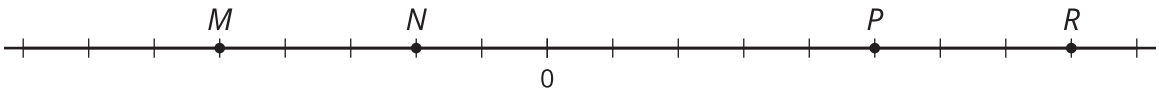
3.2 Ordering Rational Number Cards

Your teacher will give you a set of number cards. Take turns with your partner placing a card from the set in order from least to greatest.

1. For each placement that you make, explain your reasoning to your partner.
2. For each placement that your partner makes, listen carefully to their explanation. If you disagree, discuss your thinking, and work to reach an agreement.
3. Pause after the first set so your teacher can review your ordering.
4. Your teacher will give you a second set of cards to add in order with the first set.

3.3 Comparing Points on a Line

The number line shows 4 points: M, N, P, and R.



Use each of the following phrases in a sentence describing or comparing the values of 2 of the points.

- greater than
- less than
- opposite of (or opposites)
- negative number

Are you ready for more?

Tell what the value of each point M, N, P, and R would be if:

1. P is $2\frac{1}{2}$.
2. N is -0.4.
3. R is 200.
4. M is -15.

3.4 Drinks for Sale

A vending machine in an office building sells bottled beverages. The machine keeps track of all changes in the number of bottles from sales and from machine refills and maintenance. This table shows the changes for every 1-hour period over one day.

1. What does a positive number in the second column mean in this context? What does a negative number mean in this context?

time	number of bottles
8:00–8:59	-1
9:00–9:59	+12
10:00–10:59	-4
11:00–11:59	-1
12:00–12:59	-5
1:00–1:59	-12
2:00–2:59	-2
3:00–3:59	0
4:00–4:59	0
5:00–5:59	-6
6:00–6:59	+24
7:00–7:59	0
service	

2. What would a “0” in the second column mean in this situation?

3. Which numbers—positive or negative—result in fewer bottles in the machine?

4. At what time was there the greatest change in the number of bottles in the machine? How did that change affect the number of remaining bottles in the machine?

5. At which time period, 9:00–9:59 AM or 1:00–1:59 PM, was there a greater change to the number of bottles in the machine? Explain your reasoning.

6. The machine must be emptied to be serviced. If there are 40 bottles in the machine when it is to be serviced, what number will go in the second column in the table?

Are you ready for more?

Priya, Mai, and Lin went to a cafe on a weekend. Their shared bill came to $25. Each student gave the server a $10 bill. The server took this $30 and brought back five $1 bills in change. Each student took $1 back, leaving the rest, $2, as a tip for the server.

As she walked away from the cafe, Lin thought, "Wait—this doesn't make sense. Since I put in $10 and got $1 back, I ended up paying $9. So did Mai and Priya. Together, we paid $27. Then we left a $2 tip. That makes $29 total. And yet we originally gave the waiter $30. Where did the extra dollar go?"

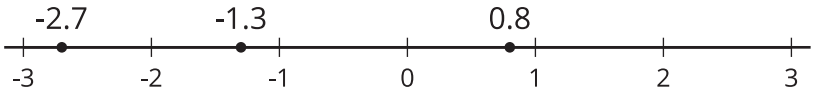
Think about the situation and about Lin's question. Do you agree that the numbers didn't add up properly? Explain your reasoning.

Lesson 3 Summary

When ordering rational numbers from least to greatest, they can be listed in the order they appear on the number line from left to right. For example, we can see that the numbers

-2.7, -1.3, 0.8

are listed from least to greatest because of the order they appear on the number line.



On a horizontal number line, numbers to the left are smaller than numbers to the right. We can say that -2.7 is less than -1.3. We can write $-2.7 < -1.3$.

Similarly, numbers to the right are greater than numbers to the left. We can say that 0.8 is greater than -2.7. We can write $0.8 > -2.7$.