

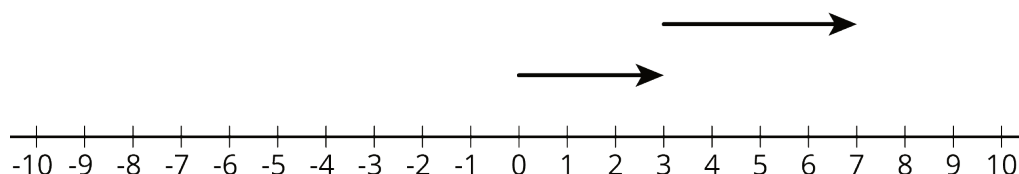
Lesson 6: Changing Temperatures

Let's add signed numbers.

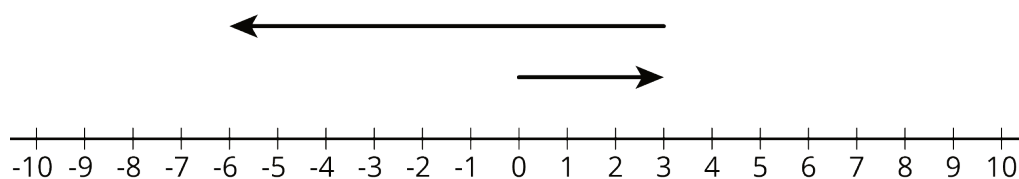
6.1: Which One Doesn't Belong: Arrows

Which pair of arrows doesn't belong?

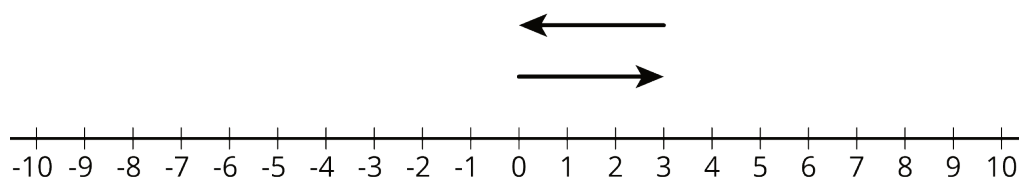
1.



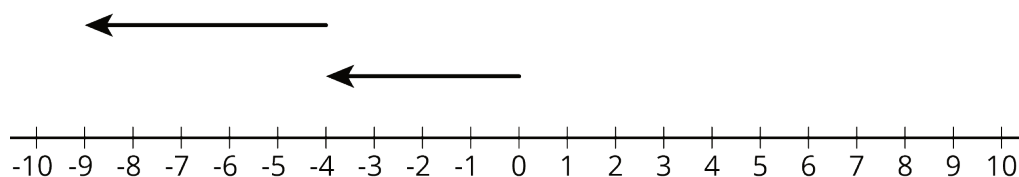
2.



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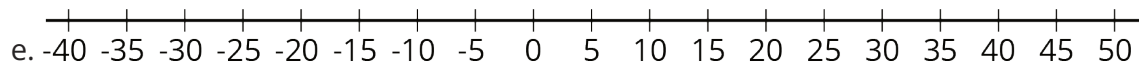
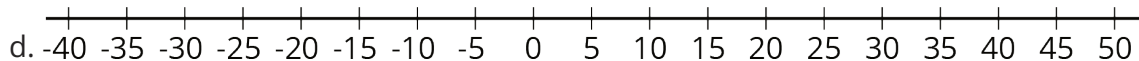
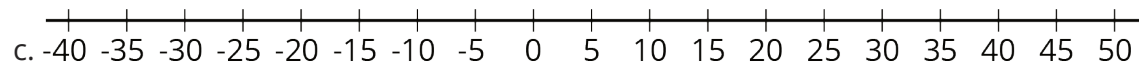
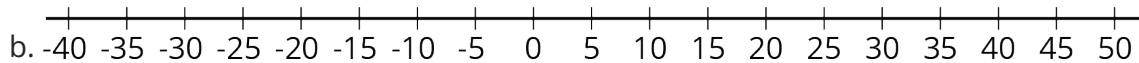
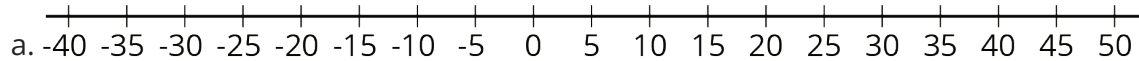
4.



6.2: Warmer and Colder

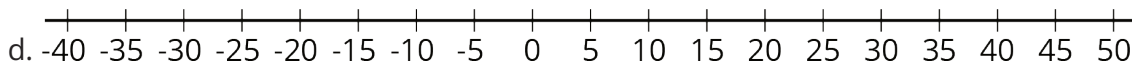
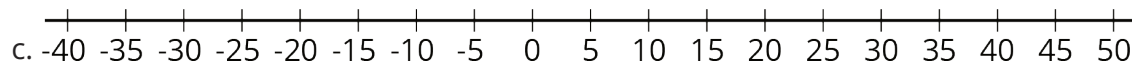
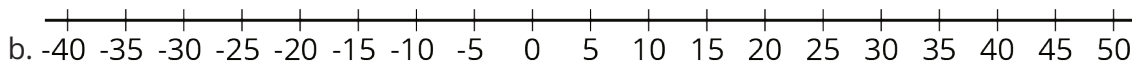
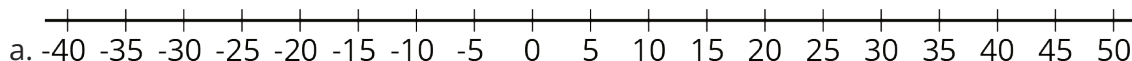
1. Complete the table and draw a number line diagram for each situation.

| | start (°C) | change (°C) | final (°C) | addition equation |
|---|------------|-------------------|------------|-------------------|
| a | +40 | 10 degrees warmer | +50 | $40 + 10 = 50$ |
| b | +40 | 5 degrees colder | | |
| c | +40 | 30 degrees colder | | |
| d | +40 | 40 degrees colder | | |
| e | +40 | 50 degrees colder | | |

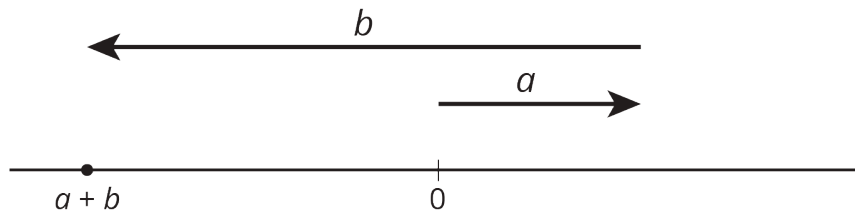


2. Complete the table and draw a number line diagram for each situation.

| | start ($^{\circ}\text{C}$) | change ($^{\circ}\text{C}$) | final ($^{\circ}\text{C}$) | addition equation |
|---|------------------------------|-------------------------------|------------------------------|-------------------|
| a | -20 | 30 degrees warmer | | |
| b | -20 | 35 degrees warmer | | |
| c | -20 | 15 degrees warmer | | |
| d | -20 | 15 degrees colder | | |



Are you ready for more?



For the numbers a and b represented in the figure, which expression is equal to $|a + b|$?

$|a| + |b|$

$|a| - |b|$

$|b| - |a|$

6.3: Winter Temperatures

One winter day, the temperature in Houston is 8° Celsius. Find the temperatures in these other cities. Explain or show your reasoning.

1. In Orlando, it is 10° warmer than it is in Houston.
2. In Salt Lake City, it is 8° colder than it is in Houston.
3. In Minneapolis, it is 20° colder than it is in Houston.
4. In Fairbanks, it is 10° colder than it is in *Minneapolis*.
5. Write an addition equation that represents the relationship between the temperature in Houston and the temperature in Fairbanks.

Lesson 6 Summary

If it is 42° outside and the temperature increases by 7° , then we can add the initial temperature and the change in temperature to find the final temperature.

$$42 + 7 = 49$$

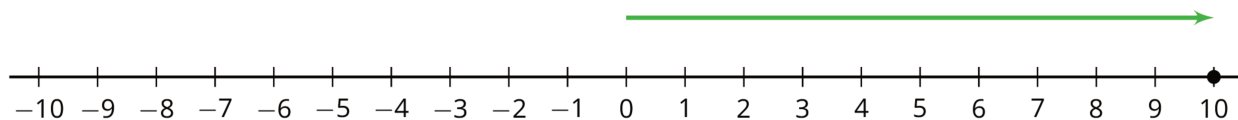
If the temperature decreases by 7° , we can either subtract $42 - 7$ to find the final temperature, or we can think of the change as -7° . Again, we can add to find the final temperature.

$$42 + (-7) = 35$$

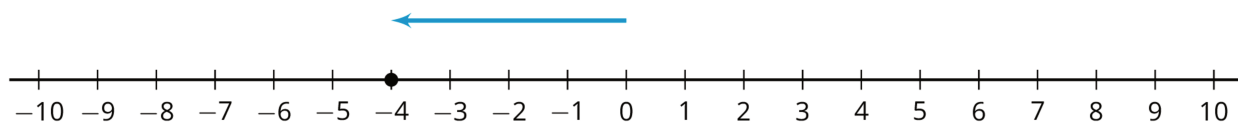
In general, we can represent a change in temperature with a positive number if it increases and a negative number if it decreases. Then we can find the final temperature by adding the initial temperature and the change. If it is 3° and the temperature decreases by 7° , then we can add to find the final temperature.

$$3 + (-7) = -4$$

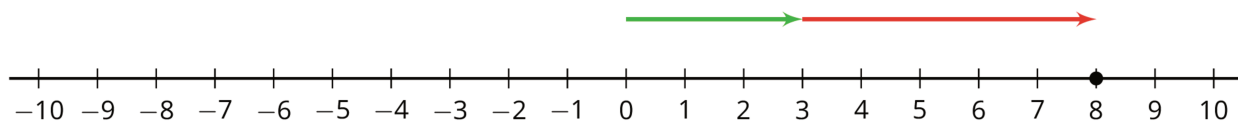
We can represent signed numbers with arrows on a number line. We can represent positive numbers with arrows that start at 0 and point to the right. For example, this arrow represents $+10$ because it is 10 units long and it points to the right.



We can represent negative numbers with arrows that start at 0 and point to the left. For example, this arrow represents -4 because it is 4 units long and it points to the left.



To represent addition, we put the arrows "tip to tail." So this diagram represents $3 + 5$:



And this represents $3 + (-5)$:

