Unit 5, Lesson 2

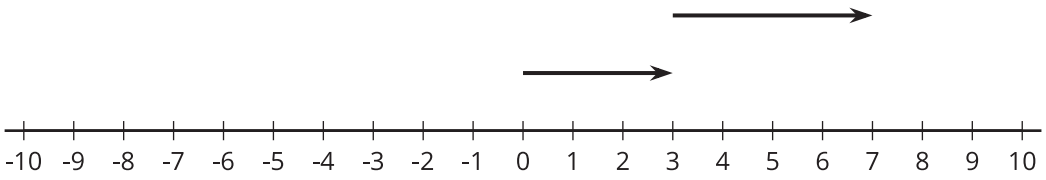
Changing Temperatures

Let's add signed numbers.

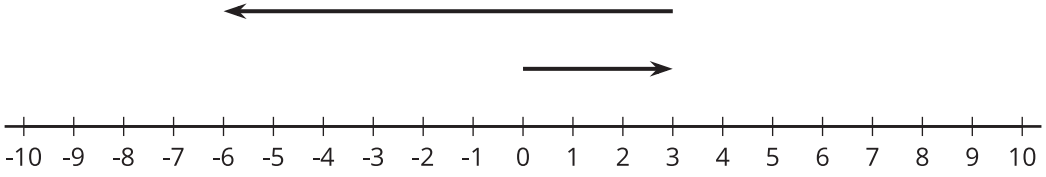
2.1 Which Three Go Together: Arrows

Which three go together? Why do they go together?

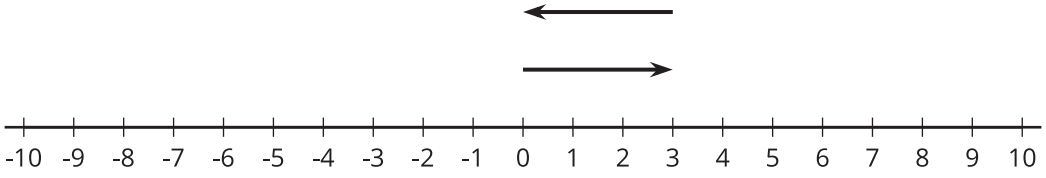
A.



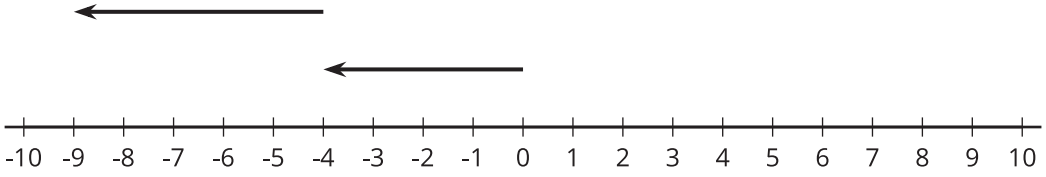
B.



C.



D.



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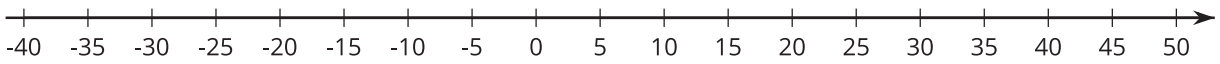
2.2 Warmer and Colder

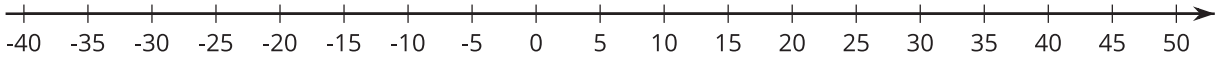
1. Complete the table, and draw a number line diagram for each situation.

	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		

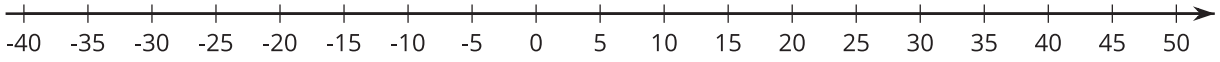
a.



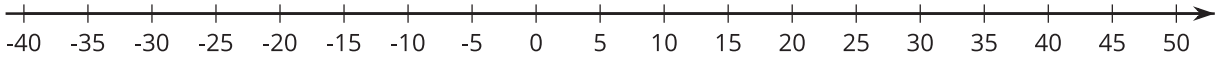
b.



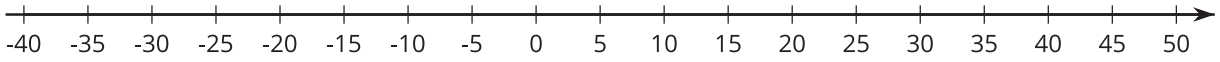
c.



d.



e.



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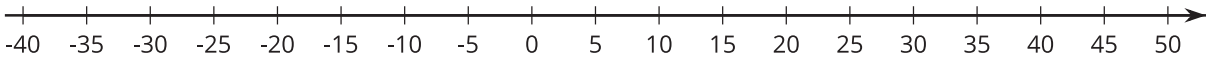
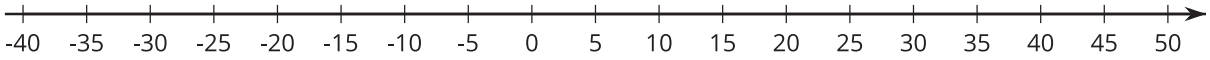
2. Complete the table, and draw a number line diagram for each situation.

	start (°C)	change (°C)	final (°C)	addition equation
a	-20	30 degrees warmer		
b	-20	35 degrees warmer		
c	-20	15 degrees warmer		
d	-20	15 degrees colder		

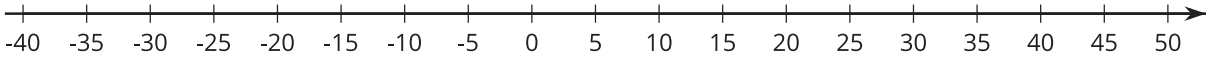
a.



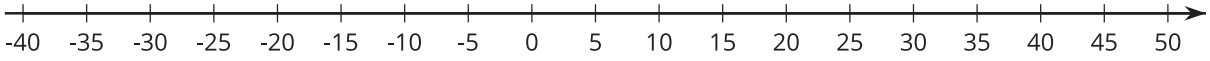
b.



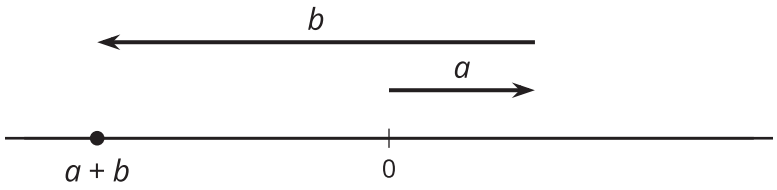
c.



d.



Are you ready for more?



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

$|a| + |b|$ $|a| - |b|$ $|b| - |a|$

2.3 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.

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Lesson 2 Summary

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

$$42 + 7 = 49$$

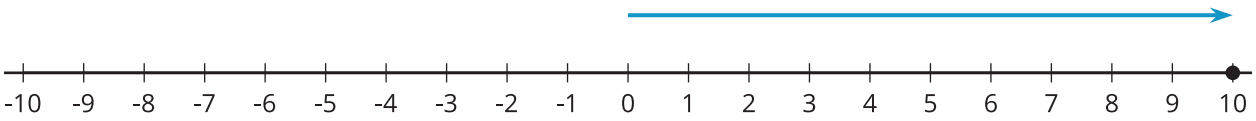
If the temperature decreases by 7°F, we can either subtract $42 - 7$ to find the final temperature, or we can think of the change as -7°F. As in the previous example, we can add to find the final temperature.

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

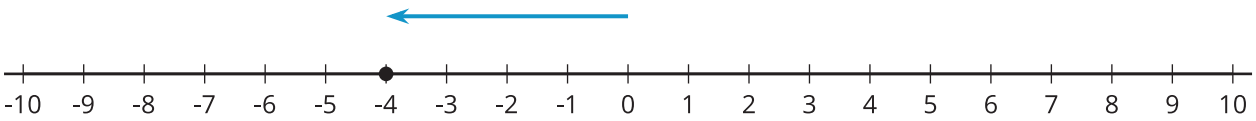
In general, we can represent a change in temperature with a positive number if it increases and with a negative number if it decreases. Then we can find the final temperature by adding the initial temperature and the change. If it is 3°F and the temperature decreases by 7°F, then we can add to find the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

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

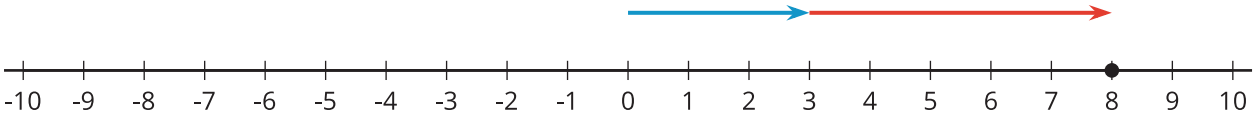
We can represent signed numbers with arrows on a number line. We can represent positive numbers with arrows that start at 0 and point to the right. For example, this arrow represents +10 because it is 10 units long and it points to the right.



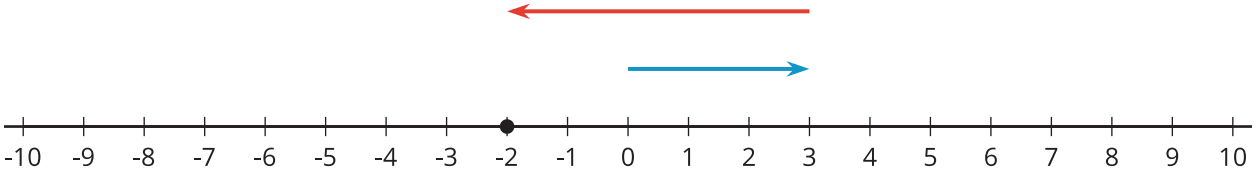
We can represent negative numbers with arrows that start at 0 and point to the left. For example, this arrow represents -4 because it is 4 units long and it points to the left.



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



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



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