Unit 5, Lesson 7

Adding and Subtracting to Solve Problems

Let's apply what we know about signed numbers to different situations.

7.1 Positive or Negative?

Complete the following problems without computing:

1. Is the solution to $-2.7 + x = -3.5$ positive or negative?

2. Select **all** the expressions that are solutions to $-2.7 + x = -3.5$.

   A. $-3.5 + 2.7$

   B. $3.5 - 2.7$

   C. $-3.5 - (-2.7)$

   D. $-3.5 - 2.7$

7.2 Phone Inventory

A store tracks the number of cell phones it has in stock and how many phones it sells.

The table shows the inventory for one phone model at the beginning of each day last week. The inventory changes when they sell phones or get shipments of phones into the store.

	inventory	change
Monday	18	-2
Tuesday	16	-5
Wednesday	11	-7
Thursday	4	-6
Friday	-2	20

1. What do you think it means when the change is positive? Negative?

2. What do you think it means when the inventory is positive? Negative?

3. Based on the information in the table, what do you think the inventory will be on Saturday morning? Explain your reasoning.

4. What is the difference between the greatest inventory and the least inventory?

7.3 Climbing Mount Kilimanjaro

For each problem, use at least one negative number to represent the situation. Then, answer the question, and explain or show your reasoning.



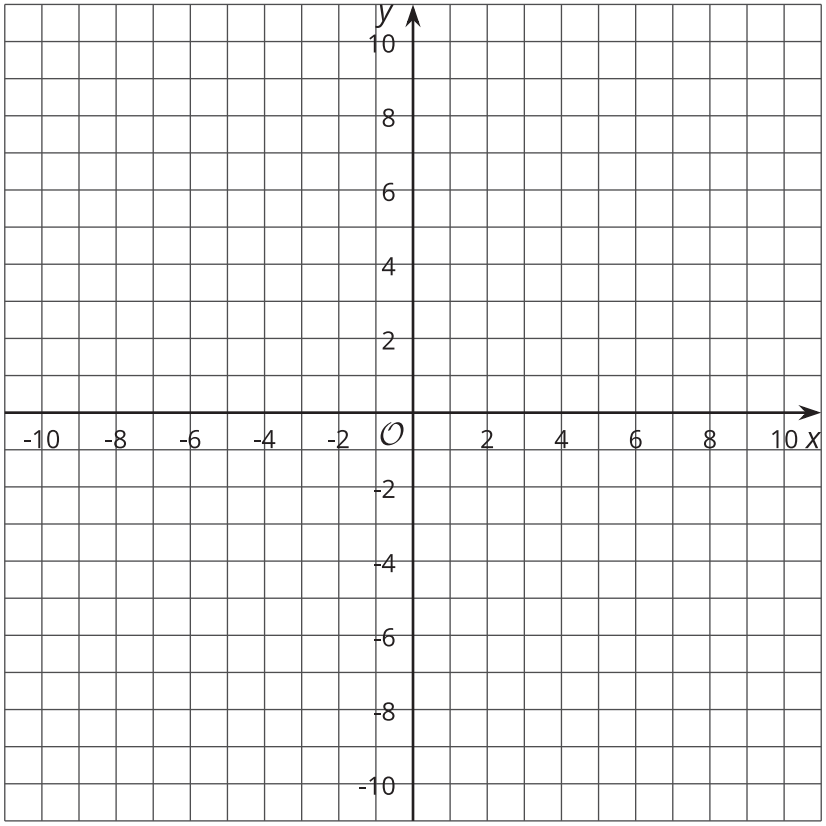
1. A hiker is climbing Mount Kilimanjaro. On day 2, the hiker starts at an elevation of 2,785 meters. He hikes up 278 meters, down 87 meters, up 548 meters, and back down 20 meters. What elevation does he end the day at?

2. On day 4, he hikes up 732 meters to Lava Tower and then back down 641 meters. He ends the day at an elevation of 3,986 meters. What elevation did he start the day at?

3. On day 6, he starts at an elevation of 4,662 meters. He hikes 1,233 meters up to Uhuru Peak and then 2,789 meters back down. What is the difference between his final and beginning elevations that day?

7.4 Differences and Distances

Plot and label these points in the coordinate plane: $A(5, 4)$, $B(5, -2)$, $C(-3, -2)$, $D(-3, 4)$.



1. Connect the dots in order. What shape is made?
2. What are the side lengths of figure $ABCD$?
3. What is the difference between the x-coordinates of B and C?
4. What is the difference between the x-coordinates of C and B?
5. How do the differences of the coordinates relate to the distances between the points?

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Lesson 7 Summary

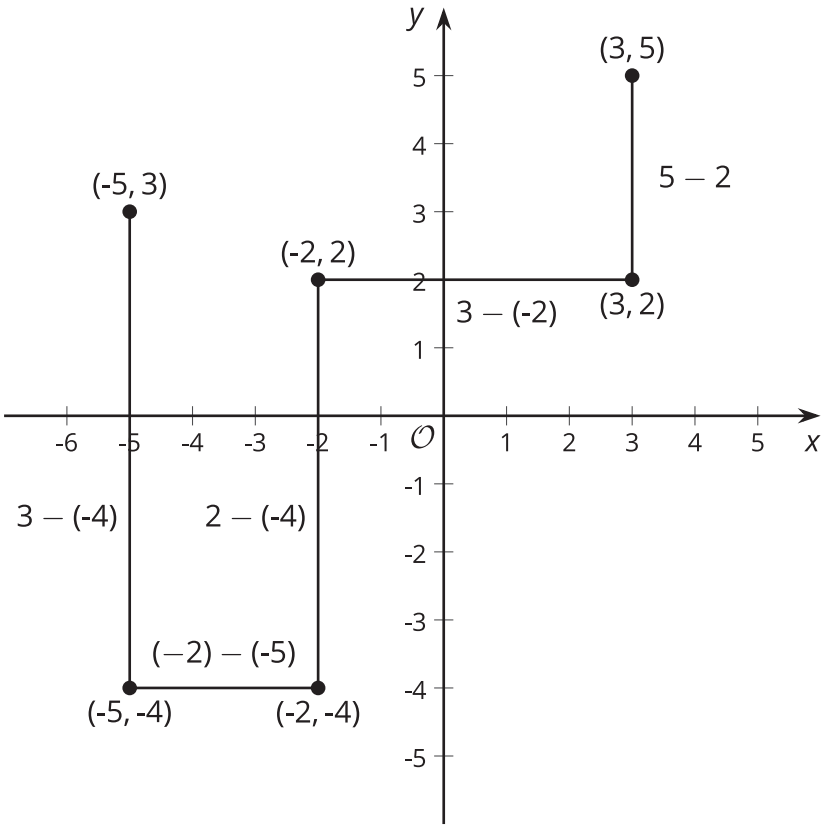
Sometimes we use positive and negative numbers to represent quantities in context. Here are some contexts we have studied that can be represented with positive and negative numbers:

- Temperature
- Elevation
- Money
- Inventory

Using positive and negative numbers (and operations on positive and negative numbers) helps us understand and analyze the situations in context. To solve problems in these situations, we just have to understand what it means when a quantity is positive, what it means when a quantity is negative, and what it means to add and subtract quantities.

When two points in the coordinate plane lie on a horizontal line, we can find the distance between them by subtracting their x-coordinates.

When two points in the coordinate plane lie on a vertical line, we can find the distance between them by subtracting their y-coordinates.



Remember: The *distance* between two numbers is independent of the order, whereas the *difference* depends on the order.