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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?

Without computing:

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

2. Which of the following are solutions to $-2.7 + x = -3.5$?

$-3.5 + 2.7$ $-3.5 - (-2.7)$

$3.5 - 2.7$ $-3.5 - 2.7$

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?

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

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

7.3: Solar Power

Han's family got a solar panel. Each month they get a credit to their account for the electricity that is generated by the solar panel. The credit they receive varies based on how sunny it is.

In January they used $83.56 worth of electricity and generated $6.75 worth of electricity. Here is their electricity bill from January.

Current charges: $83.56

Solar Credit: -$6.75

Amount due: $74.81

1. In July they were traveling away from home and only used $19.24 worth of electricity. Their solar panel generated $22.75 worth of electricity. What was their amount due in July?

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2. The table shows the value of the electricity they used and the value of the electricity they generated each week for a month. What amount is due for this month?

	used ($)	generated ($)
week 1	13.45	-6.33
week 2	21.78	-8.94
week 3	18.12	-7.70
week 4	24.05	-5.36

3. What is the difference between the value of the electricity generated in week 1 and week 2? Between week 2 and week 3?

Are you ready for more?

While most rooms in any building are all at the same level of air pressure, hospitals make use of "positive pressure rooms" and "negative pressure rooms." What do you think it means to have negative pressure in this setting? What could be some uses of these rooms?

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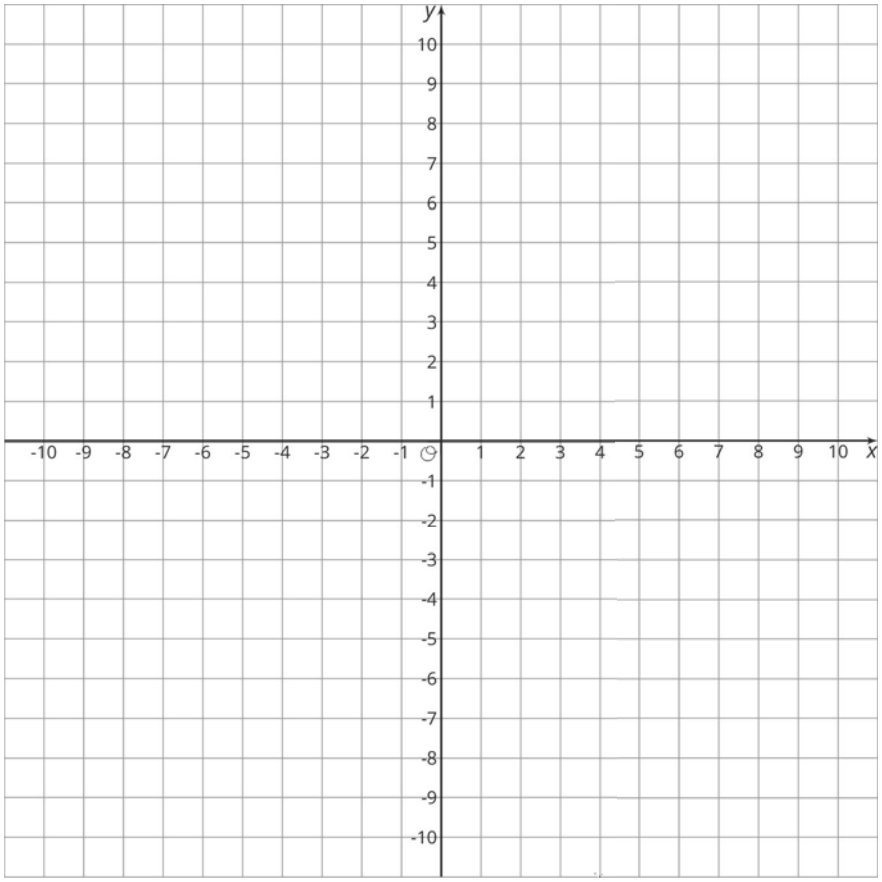
7.4: Differences and Distances

m.openup.org/1/7-5-7-4

Plot these points on the coordinate grid:
$A = (5, 4), B = (5, -2), C = (-3, -2), D = (-3, 4)$



1. What shape is made if you connect the dots in order?

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

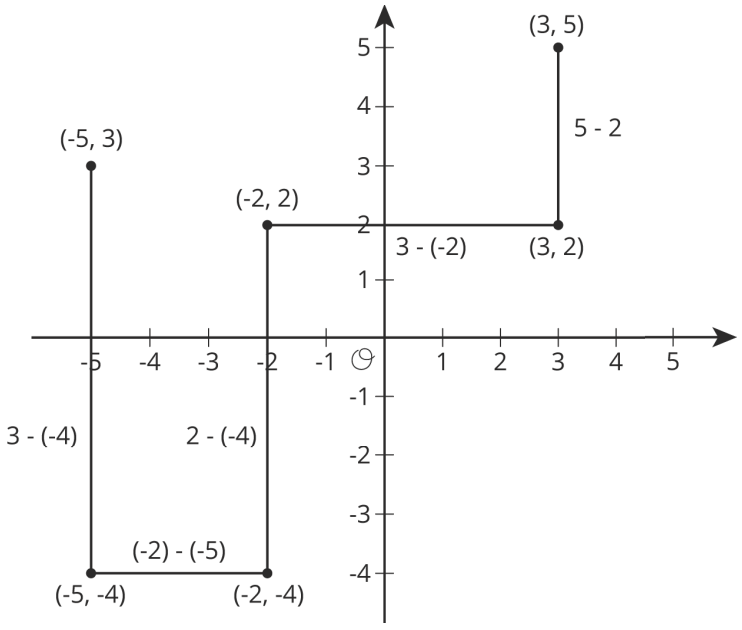
Sometimes we use positive and negative numbers to represent quantities in context. Here are some contexts we have studied that can be represented with positive and negative numbers:

- temperature
- elevation
- inventory
- an account balance
- electricity flowing in and flowing out

In these situations, using positive and negative numbers, and operations on positive and negative numbers, helps us understand and analyze them. To solve problems in these situations, we just have to understand what it means when the quantity is positive, when it is negative, and what it means to add and subtract them.

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

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



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

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1. Tyler orders a meal that costs $15.

   a. If the tax rate is 6.6%, how much will the sales tax be on Tyler's meal?

   b. Tyler also wants to leave a tip for the server. How much do you think he should pay in all? Explain your reasoning.

   (from Unit 4, Lesson 10)

2. In a video game, a character is healed at a constant rate as long as they are standing in a certain circle. Complete the table.

time in circle (seconds)	health gained (points)
4	100
10	
3	
	1,000

   (from Unit 2, Lesson 3)

3. a. How much higher is 500 than 400 m?

   b. How much higher is 500 than -400 m?

   c. What is the change in elevation from 8,500 m to 3,400 m?

   d. What is the change in elevation between 8,500 m and -300 m?

   e. How much higher is -200 m than 450 m?

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(from Unit 5, Lesson 6)

4. The table shows four transactions and the resulting account balance in a bank account, except some numbers are missing. Fill in the missing numbers.

	transaction amount	account balance
transaction 1	360	360
transaction 2	-22.50	337.50
transaction 3		182.35
transaction 4		-41.40

5. The *departure from the average* is the difference between the actual amount of rain and the average amount of rain for a given month.

   The historical average for rainfall in Albuquerque, NM for June, July, and August is shown in the table.

June	July	August
0.67	1.5	1.57

   a. Last June only 0.17 inches of rain fell all month. What is the difference between the average rainfall and the actual rainfall for last June?

   b. The departure from the average rainfall last July was -0.36 inches. How much rain fell last July?

   c. How much rain would have to fall in August so that the total amount of rain equals the average rainfall for these three months? What would the departure from the average be in August in that situation?