

Understand Subtraction of Positive and Negative Integers

Name: _____

Prerequisite: How do you add integers using a number line?



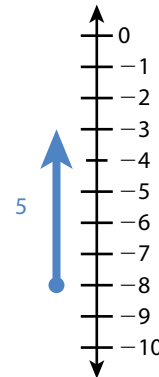
Study the example problem showing how to add positive and negative integers. Then solve problems 1–7.

Example

When Leo woke up he saw that the temperature was -8°F . By noon the temperature had increased 5°F . What was the temperature at noon?

You can use a number line to add $-8 + 5$.

$-8 + 5 = -3$, so the temperature at noon was -3°F .



- 1** By 3:00 PM, the temperature had increased by another 5°F . Was the temperature at 3:00 PM positive or negative? How do you know? What was the temperature at 3:00 PM?

- 2** By 11:00 PM, the temperature had dropped 8°F . Was the temperature at 11:00 PM positive or negative? Explain.

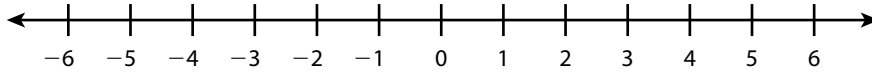
- 3** A swimmer dives 10 feet below the surface of a lake. How far must she swim before she reaches the surface? Use an addition equation to explain, and tell what each part of the equation means.



Solve.

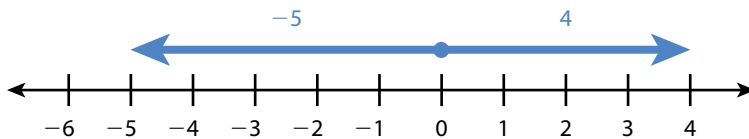
- 4 Use a number line to show $4 + (-7)$. Then complete the equation that shows the sum.

$4 + (-7) = \underline{\hspace{2cm}}$



- 5 In a game that you are playing, your friend says that she has -6 points “give or take” 4 points. You currently have -3 points in the game. Can you say who is winning? Why or why not? Use a number line to explain.

- 6 Leon used the number line below to show $-5 + 4$. Explain what is wrong with his model.



- 7 The sum of two integers is -4 .
- a. Can the two integers both be positive? Explain.

- b. Can the two integers both be negative? Explain.

Subtract Positive and Negative Integers

Study the example problem showing how to subtract two integers. Then solve problems 1–4.

Example

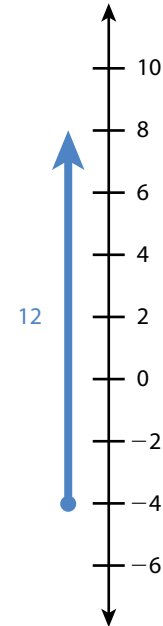
What is the difference between an elevation of -4 feet and an elevation of 8 feet?

Find the difference by subtracting: $8 - (-4)$.

Write the subtraction as an addition problem: $8 + 4$.

Model the addition problem on a number line.

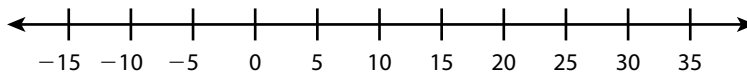
The difference in the elevations is 12 feet.



- 1** Marcie is playing a board game with a friend. She needs 20 points to win. She currently has -10 points. She wants to know the difference between the number of points she now has and the number of points she needs.

- a.** Write a subtraction problem to represent the situation. Then write the subtraction problem as an addition problem.

- b.** Model the addition problem on the number line.



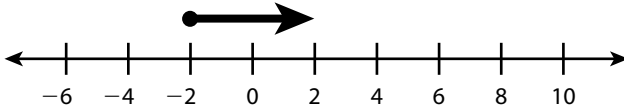
- c.** What is the difference between the number of points she needs to win and the number of points she now has?



Solve.

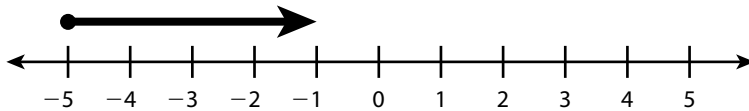
2 Jessie uses the number line below to help write $-2 + (-4)$ as a subtraction problem.

a. What is wrong with Jessie's number line?



b. Write the subtraction problem and the answer.

3 Use the number line below to solve the problems.



a. What is the distance between -5 and -1 on the number line? _____

b. What is $|-5 - (-1)|$? _____

c. What do you notice about the absolute value of the difference between the two numbers?

4 What number must be subtracted from -5 for the difference to be -2 ? Explain your answer. Include a number line in your explanation.

Reason and Write

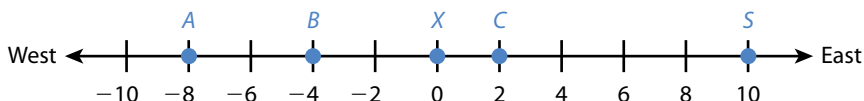
Study the example. Underline two parts that you think make it a particularly good answer and a helpful example.

Example

You and your friends Aaron, Beth, and Craig all live on the same street that the school is on. Aaron lives farthest from the school. You and Aaron live the same distance from Beth's house. Craig lives closest to the school.

Place points A for Aaron's house, B for Beth's house, C for Craig's house, and S for the school on a number line. Let your house X be at 0. Describe each person's location and use absolute value to find the distance that each person has to walk to and from school. Then, list the locations in order from farthest from the school to closest to the school.

Show your work. Use the number line, words, absolute value, and equations to explain your answer.



Aaron's house is located at -8 on my number line, and the school is at 10 . So his distance from school is:

$|10 - (-8)| = |18| = 18$ units. He has to walk $2(18) = 36$ units to and from school each day.

Beth's house is located at -4 on my number line, and the school is at 10 . So her distance from school is:

$|10 - (-4)| = |14| = 14$ units. She has to walk $2(14) = 28$ units to and from school each day.

My house is located at 0 on my number line, and the school is at 10 . So my distance from school is:

$|10 - 0| = |10| = 10$ units. I have to walk $2(10) = 20$ units to and from school each day.

Craig's house is located at 2 on my number line, and the school is at 10 . So his distance from school is:

$|10 - 2| = |8| = 8$ units. He has to walk $2(8) = 16$ units to and from school each day.

In order from farthest to closest, the locations are Aaron's house, Beth's house, my house, Craig's house.

Where does the example...

- use the number line?
- use words?
- use absolute value?
- use equations?
- answer each part of the problem?

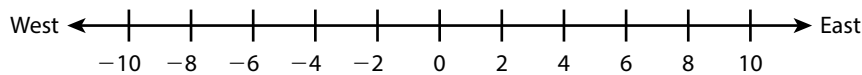


Solve the problem. Use what you learned from the model.

You and your friends Ari, Ben, and Carla all live on the same street that some tennis courts are on. Ari and Carla live the same distance from the tennis courts. Ben lives farthest from the courts. You live the same distance from Ben's house and the tennis courts.

Place points A for Ari's house, B for Ben's house, C for Carla's house, and T for the tennis courts on a number line. Let your house X be at 0. Describe each person's location and use absolute value to find the distance that each person has to walk to and back home from the tennis courts. Then, list the locations in order from farthest from the courts to closest to the courts.

Show your work. Use the number line, words, absolute value, and equations to explain your answer.



Did you ...

- use the number line?
- use words?
- use absolute value?
- use equations?
- answer each part of the problem?

