

## Grade 7: Signed Numbers

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**7.NS.A.1** - Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

Add. Write your answer in the box.

$$-4.1 + 4 = \boxed{\phantom{000}}$$

### Solution

Correct if student writes any of the following:

$-.1$     $-0.1$     $-.10$     $-00.1$     $-0.10$     $-.100$     $-1/10$     $-.1/1$     $.1/-1$

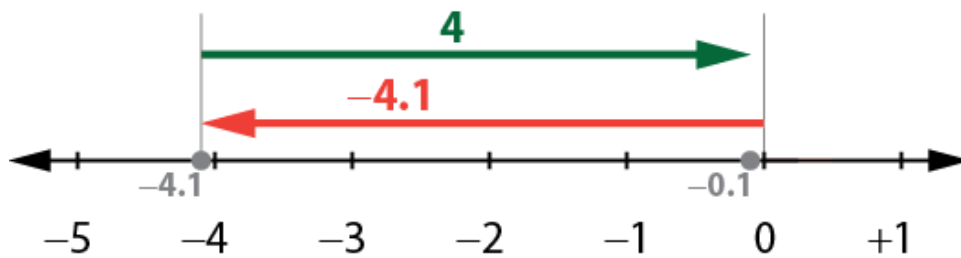
$$-4.1 + 4 = -0.1.$$

The answer  $-0.1$  could also be written in equivalent ways (such as  $-1/10$  or  $-.10$ , for example).

If students answer this question wrong, try explaining the result  $-0.1$  with an everyday analogy. For example, some analogies could include:

- If the temperature outside is initially 4.1 degrees below zero, and then the temperature rises 4 degrees, then the new temperature will be 0.1 degrees below zero.
- A person lost \$4.10, then found \$4.00. What is the net result of these two events?
- A mouse, initially located 4.1 meters to the left of a stone, walks 4 meters to the right. Where is the mouse now, relative to the stone?
- A toddler pulls on a teddy bear with a leftward force of 4.1 lb, while the babysitter pulls rightward with a force of 4 lb. (The toddler is winning this tug of war.)
- A touchscreen, initially carrying a static charge of  $-4.1$  units, gains 4 units of positive charge. What is the amount of charge on the touchscreen now?

A number line diagram can help to illustrate addition of signed numbers:



One way to think about the problem is that  $-4.1 + 4$  will be the number located 4 units to the right of  $-4.1$  on the number line.

Another way to think about the problem is that when you add 4 to  $-4.1$ , the positive 4 “cancels out” part of  $-4.1$ , leaving a net result of  $-0.1$ . This idea could be summarized as  $-4.1 + 4 = -|4.1 - 4|$ , where the bars represent absolute value.

### Elaboration on Alignment

This is intended to be an easy problem in rational arithmetic. The following factors do increase the difficulty, but they also make it more likely that ideas of rational arithmetic (magnitude, cancellation) are actually in play: the negative addend comes first, and it's the larger addend in absolute value; the whole number in the first addend (4) and the whole number in the second addend (4) are the same; the sum is a decimal quantity.

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Name: \_\_\_\_\_

Add. Write your answer in the box.

$$-4.1 + 4 = \boxed{\phantom{000}}$$