

ADDING & SUBTRACTING ON THE NUMBER LINE

2

Name: Key Date: _____ Period: _____

SECTION 2.5 INTEGER PROPERTIES AND TERMINOLOGY

VOCABULARY

DEFINITION	EXAMPLE
Additive Identity Property: Adding 0 to any number does not change the number. $x + 0 = x$	$3 + 0 = 3$
Additive Inverse Property: The opposite of a number is the same distance from 0: $x + -x = 0$	$5 + -5 = 0$
Double Opposite Property: $-(-x) = x$	$-(-2) = 2$
Distance: absolute value of the difference of two numbers: $ x - y $	distance between -7 and 3 = $ -7 - 3 = 10$
Subtraction Property: for any two numbers x and y, $x - y = x + -y$	$5 - 2 = 3$ $5 + -2 = 3$
Commutative Property of Addition: $x + y = y + x$ changing the order in addition keeps the same sum	$3 + 8 = 11 = 8 + 3$
Associative Property of Addition: $x + (y + z) = (x + y) + z$ the grouping of addition keeps the same sum	$3 + (2 + 5) = 3 + 7 = 10$ $(3 + 2) + 5 = 5 + 5 = 10$

Big Idea: What general patterns and properties have we discovered about integers?

EXPLORATORY QUESTIONS

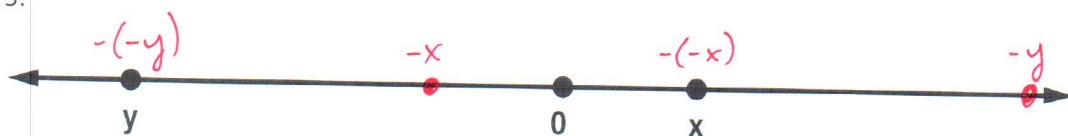
- I am a number. If you add me to any integer, I do not change that number. What number am I?

0.

- Can you find a pair of numbers on the number line that are the same distance from zero? What happens when you add them together?

Yes, examples include 2 and -2, 328 and -328, etc.
Their sum is 0.

3.



- a. Locate $-x$
 b. Locate $-(-x)$
 c. Locate $-y$
 d. Locate $-(-y)$

4.

What is the distance between x and y on the following number line? Does it matter if x and y are both positive or negative? Explain.

*The distance is $|x-y|$ or $|y-x|$.
 Either will work, and it doesn't matter if they are positive*



or negative. Additionally, since $y > x$, $y-x$ is also the distance.

5.

Show that the distance between 4 and -5 is the same as the distance between -5 and 4 by using the distance definition 2.2, from the text, distance = $|x - y|$.

$$|4 - (-5)| = |9| = 9$$

✓

$$|-5 - 4| = |-9| = 9$$

PRACTICE EXERCISES

1. Compute the value of each of the following:

- a. $-(-22) = \underline{22}$ b. $-(-4) = \underline{4}$ c. $-(-17) = \underline{17}$

2. Find the distance between each pair of points below.

- a. 11 and 3 8 b. 17 and -2 19 c. -1 and -9 8

- 3 and 11 8 -2 and 17 19 -9 and -1 8

- d. Describe what you notice about the distances between the pairs. Explain what this suggests about distance between points.

Answers will vary: the distance between a and b is the same as the distance between b and a , and if you subtract and then take the absolute value, it doesn't matter which you subtracted from the other and it will be the same, etc.

3. Kiernan decided to write addition problems in reverse order because it was opposite day. If the question on the board was $2 + 8 + -3 + 11 = \underline{\hspace{1cm}}$, would Jamie still get the same answer if he calculated the sum of $11 + -3 + 8 + 2$? Explain.

Yes, the sum will be the same because of the commutative property of addition.

$$2 + 8 + -3 + 11 = 10 + -3 + 11 = 7 + 11 = 18$$

or $11 + -3 + 8 + 2 = 8 + 8 + 2 = 16 + 2 = 18$

4. Compute the following:

a. $(1 + 3) + 7 = \underline{11}$ and $1 + (3 + 7) = \underline{11}$
 $4 + 7$ $1 + 10$

b. $-2 + (3 + 6) = \underline{7}$ and $(-2 + 3) + 6 = \underline{7}$
 $-2 + 9$ $1 + 6$

SUMMARY (What I learned today)
