Objective   Adding Integers, Part I

Warm-Up

A large hotel has a ground floor (street level) and 26 floors of guest rooms above street level, which can be modeled by positive integers. There are 5 floors of parking below street level, which can be modeled by negative integers.

In this hotel, street level is represented by zero.
Write an integer addition problem that models the hotel elevator's motion in each case.

1. The elevator starts at street level, goes up 7 floors, and then goes down 3 floors.

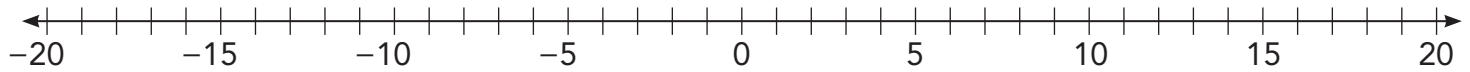2. The elevator starts at street level, goes up 10 floors, and then goes down 12 floors.

Getting on Line

Use the number line and determine the number described by each.
Explain your reasoning.

1. the number that is 7 more than -9

2. the number that is 2 more than -6

3. the number that is 10 more than -8

4. the number that is 10 less than 6

5. the number that is 5 less than -4

6. the number that is 2 less than -4

Walking a number line can help you to add positive and negative numbers.
Walk the number line for an addition sentence:

- Start at zero and walk to the value of the first term of the expression.
- To indicate addition, turn to face up the number line, towards the greater positive numbers.
- Walk forward if adding a positive number or walk backward if adding a negative number.

You and your partner will use the number line and simmulate walking the number line to determine in which direction you will face before and after.

1. Copy and complete the table

	Where You Start	Direction You Face	Walk Backwards or Forwards	Final Location
1 + 3				
0 + (−4)				
−3 + 5				
−1 + (−4)				

This worked example represents the movement created by walking the number line.
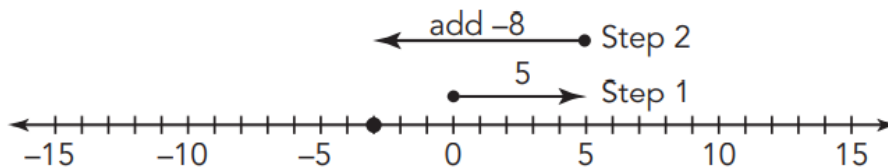

WORKED EXAMPLE

A number line can be used to model integer addition.
When adding a positive integer, move to the right on a number line.
When adding a negative integer, move to the left on a number line.

Example 1: The number line shows how to determine 5 + 8.
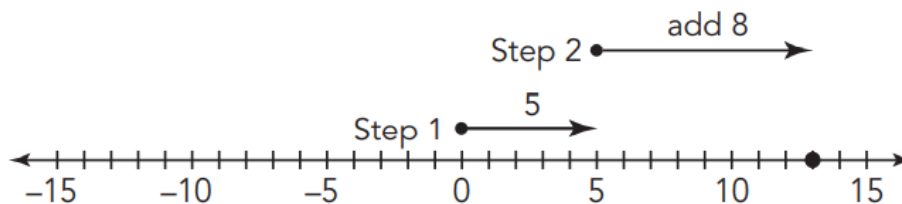
Example 2: The number line shows how to determine 5 1 (28).

Compare the first steps in each example.

2. What distance is shown by the first term in each example?

3. Describe the graphical representation of the first term. Where does it start and in which direction does it move? How does this movement represent walking the line?

4. What is the absolute value of the first term in each example?

Compare the second steps in each example

5. What distance is shown by the second term in each example?

6. Why did the arrows for the second terms both start at the endpoints of the first terms but then continue in opposite directions? Explain your reasoning.

7. What is the absolute value of the second term in each example?

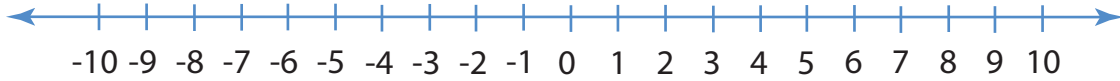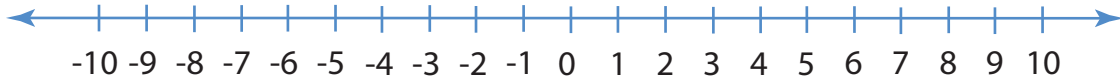**8. Use the number line to determine each sum. Show your work.**

a. −3 + 7 =

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

b. 3 + (−7) =

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

c. −3 + (−7) =

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←——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——→
   -10 -9 -8 -7 -6 -5 -4 -3 -2 -1  0  1  2  3  4  5  6  7  8  9  10
```

d. 3 + 7 =

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←——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——→
   -10 -9 -8 -7 -6 -5 -4 -3 -2 -1  0  1  2  3  4  5  6  7  8  9  10
```

Notice that the first term in each expression in parts (a) through (d) was either 3 or (−3).

9. What do you notice about the distances shown by these terms on the number lines?

10. What is the absolute value of each term?

Notice that the second term in each expression was either 7 or (−7).

11. What do you notice about the distances shown by these terms on the number lines?

12. What is the absolute value of each term?

Homework HW

LESSON 5.2a
Walk the Line

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Practice

Use the number line to determine each sum. Show your work.

1. $-6 + 4$

2. $-9 + (-2)$

3. $13 + (-12)$

4. $7 + (-14)$

5. $7 + (-1)$

6. $3 + (-13)$

7. $8 + (-8)$

8. $-2 + 8$

9. $-13 + 3$

10. $0 + (-12)$

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