

# Math Football

# 1

## Using Models to Understand Integer Addition

### WARM UP

Sketch a number line and plot each value.

1.  $-3$
2.  $0$
3.  $1$
4.  $\frac{1}{2}$
5.  $3$

### LEARNING GOALS

- Represent numbers as positive and negative integers.
- Use a number line diagram to represent the sum of positive and negative integers.

You have learned about negative numbers and can plot locations on a number line. Does addition and subtraction work the same with negative numbers as with positive numbers?

# Getting Started

## Hut! Hut! Hike!

The playing field and footballs are located at the end of the lesson. You also need two number cubes, one red and one black.

You and a partner are going to play **Math Football**. You will take turns rolling two number cubes to determine how many yards you can advance the football toward your end zone.

Player 1 will be the Home Team and Player 2 will be the Visiting Team. In the first half, the Home Team will move toward the Home end zone, and the Visiting Team will move toward the Visiting end zone.

### Rules

Players both start at the zero yard line and take turns. On your turn, roll two number cubes, one red and one black. The number on each cube represents a number of yards. Move your football to the left the number of yards shown on the red cube. Move your football to the right the number of yards shown on the black cube. Start each of your next turns from the ending position of your previous turn.

### Scoring

When players reach their end zone, they score 6 points. If players reach their opponent's end zone, they lose 2 points. An end zone begins on either the +10 or -10 yard line.

Example:

	Player	Starting Position	Results of the Number Cubes Roll	Ending Position
First Turn	Home Team	0	Red 3 and Black 5	+2
	Visiting Team	0	Red 5 and Black 6	+1
Second Turn	Home Team	+2	Red 1 and Black 6	+7
	Visiting Team	+1	Red 6 and Black 2	-3

1. Read through the table. After two turns, which player is closest to their end zone?



ACTIVITY  
**1.2**

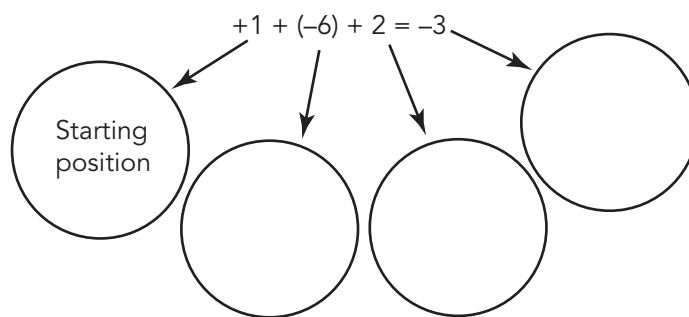
# Writing Equations with Signed Numbers



You can write equations to describe the results of number cube rolls. Think of the result of rolling the red number cube as a negative number and the result of rolling the black number cube as a positive number.

	Player	Starting Position	Results of the Number Cubes Roll	Ending Position	Number Sentence
First Turn	Home Team	0	Red 3 and Black 5	+2	$0 + (-3) + 5 = +2$
	Visiting Team	0	Red 5 and Black 6	+1	$0 + (-5) + 6 = +1$
Second Turn	Home Team	+2	Red 1 and Black 6	+7	$+2 + (-1) + 6 = +7$
	Visiting Team	+1	Red 6 and Black 2	-3	$+1 + (-6) + 2 = -3$

- Describe each part of the number sentence for the second turn of the Visiting Team player.



Play Math Football again. But this time, work with your partner to get to the Home end zone together in the first half and the Visiting end zone in the second half. Write equations to record your moves.

- Think about the number cube rolls you made in the game.
  - What kind of rolls move you closer to the Home end zone?
  - What kind of rolls move you closer to the Visiting end zone?

3. Write an equation for each situation. Use the game board for help.

- a. The Home Team player starts at the zero yard line and rolls a red 6 and a black 2. What is the ending position?

Equation: \_\_\_\_\_

- b. The Visiting Team player starts at the zero yard line and rolls a red 5 and a black 4. What is the ending position?

Equation: \_\_\_\_\_

- c. The Home Team player starts at the 5 yard line and rolls a red 2 and a black 2. What is the ending position?

Equation: \_\_\_\_\_

- d. The Visiting Team player starts at the  $-5$  yard line and rolls a red 4 and a black 6. What is the ending position?

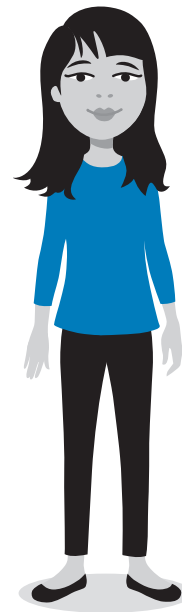
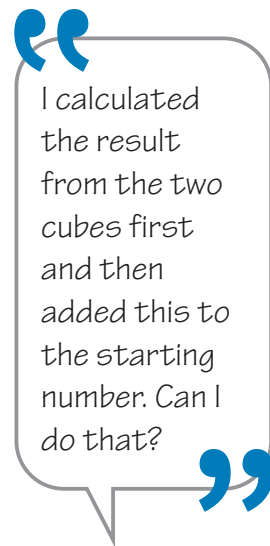
Equation: \_\_\_\_\_

- e. Suppose the Home Team player is at the  $+8$  yard line. Complete the table and write two equations that will put the player into the Home end zone.

Starting Position	Roll of the Red Number Cube	Roll of the Black Number Cube	Equation
+8			
+8			

- f. Suppose the Visiting Team player is at the  $-8$  yard line. Complete the table and write two equations that will put the player into the Visiting end zone.

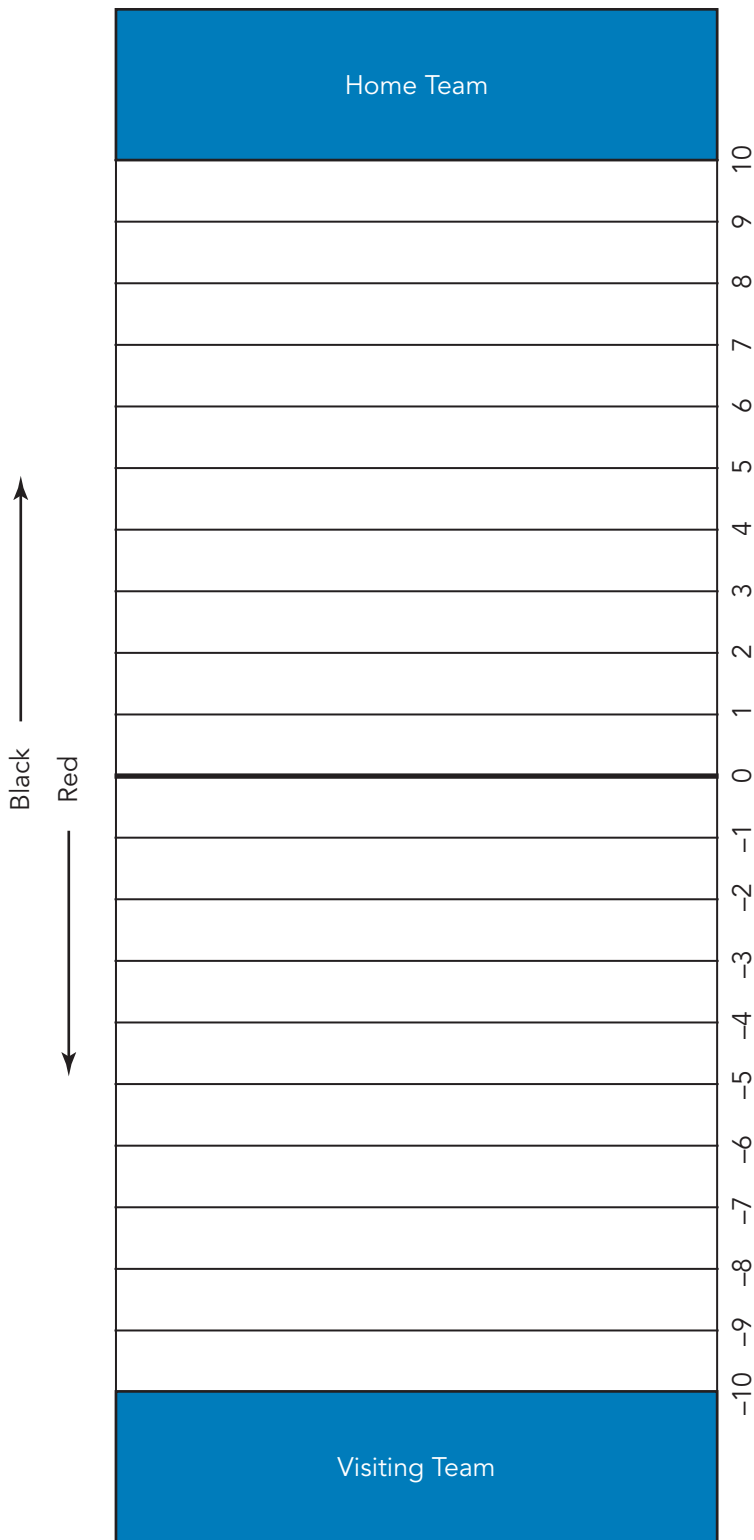
Starting Position	Roll of the Red Number Cube	Roll of the Black Number Cube	Equation
$-8$			
$-8$			



**TALK the TALK** **Mission: Possible, and Impossible**

Consider the moves you made in the Math Football game.

1. In which direction would you move if you roll:
  - a. a larger number on the black cube than on the red cube?
  - b. a larger number on the red cube than on the black cube?
  - c. two black cubes?
  - d. a black cube and a red cube?
  - e. two red cubes?
2. Is it possible to decrease in value if rolling two black cubes?  
Explain your reasoning.
3. Is it possible to increase in value if rolling two red cubes?  
Explain your reasoning.



## Stretch

Draw a model to represent the addition problem  $-3\frac{1}{2} + (-1\frac{1}{4})$ . Then determine the solution.

## Review

1. Solve each proportion.

a.  $\frac{6.6}{p} = \frac{9}{12.15}$

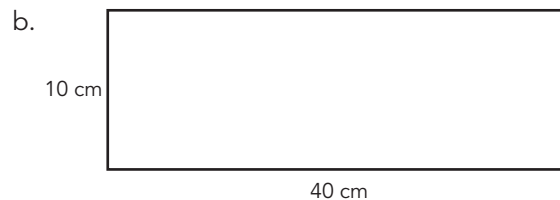
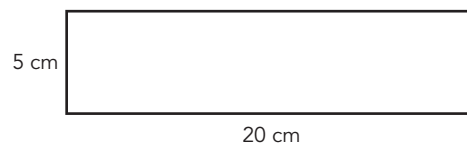
b.  $\frac{8}{10.5} = \frac{c}{6.5625}$

2. Describe which method (scaling, unit rate, or means and extremes) you would use to solve for each variable and explain why.

a.  $\frac{2}{3} = \frac{20}{x}$

b.  $\frac{16}{4} = \frac{100}{x}$

3. Determine if each rectangle is a scale drawing of the given rectangle. Explain why or why not.





**Week of: March 30-April 4**

**Grade: 7**

**Content: Math**

**Learning Objective:**

Greetings 7<sup>th</sup> graders! We hope you are safe and well with your families!

This week we are going to review adding integers using a number line.

We've included a video link to review adding and subtracting integers using a number line to help you if you get stuck! This work will not be graded, just do your best and have fun!

**Video Links:**

Khan Academy: <https://www.khanacademy.org/math/arithmetic-home/negative-numbers/add-sub-neg-number-line/v/adding-negative-numbers-on-number-line-examples>

**Practice Activities:**

On-Line

**All students now have access to an on-line program called Mathia!**

**Mathia-** If you are already in Mathia, please continue to work in the program.

**If you are new to Mathia:** Please see the log-in information attached.

Printable Resources:

**Skills Practice:** see the attached practice pages

# Module 2: Operating with Signed Numbers

## TOPIC 1: ADDING AND SUBTRACTING RATIONAL NUMBERS

In this topic, students use number lines and two-color counters to model addition and subtraction of integers before developing rules for determining the sum and difference of signed numbers. Students are expected to make connections among the representations used. After they understand what it means to add and subtract integers, students apply the rules to the set of rational numbers.

### Where have we been?

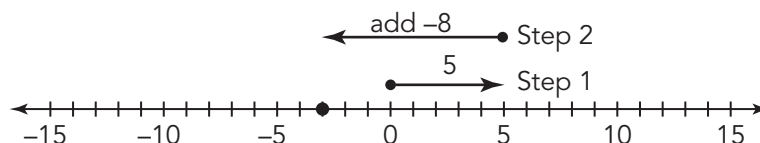
In grade 6, students learned how to represent positive and negative rational numbers on a number line. They also know that  $-p$  is  $p$  units from 0 on the number line and that  $|p| = |-p| = p$ . Students used number lines to model the distance from 0 and to model the distance between two rational numbers represented on vertical or horizontal number lines.

### Where are we going?

Students will develop a strong conceptual foundation for adding and subtracting with rational numbers to provide the foundation for manipulating and representing increasingly complex numeric and algebraic expressions in later lessons and future courses and grades.

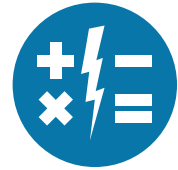
## Using a Number Line to Model Adding and Subtracting Integers

A number line can be used to model adding and subtracting negative numbers. This number line models the sum  $5 + (-8)$ .



## Myth: Students only use 10% of their brains.

Hollywood is in love with the idea that humans only use a small portion of their brains. This notion formed the basis of the movies *Lucy* (2014) and *Limitless* (2011). Both films ask the audience: Imagine what you could accomplish if you could use 100% of your brain!



Well, this isn't Hollywood, and you're stuck with an ordinary brain. The good news is that you **do** use 100% of your brain. As you look around the room, your visual cortex is busy assembling images; your motor cortex is busy moving your neck; and all of the associative areas recognize the objects that you see. Meanwhile, the corpus callosum, which is a thick band of neurons that connect the two hemispheres, ensures that all of this information is kept coordinated. Moreover, the brain does this automatically, which frees up space to ponder deep, abstract concepts...like mathematics!

### #mathmythbusted

## Talking Points

You can further support your student's learning by asking questions about the work they do in class or at home. Your student is learning to reason using signed numbers.

## Questions to Ask

- How does this problem look like something you did in class?
- Can you show me the strategy you used to solve this problem? Do you know another way to solve it?
- Does your answer make sense? How do you know?
- Is there anything you don't understand? How can you use today's lesson to help?

## Key Terms

### absolute value

The absolute value of a number is its distance from 0 on a number line.

### additive inverse

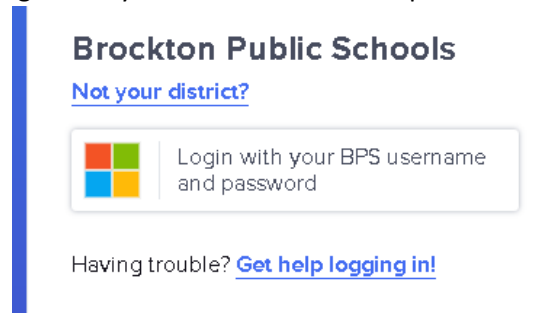
The additive inverse of a number is the opposite of the number:  $-x$  is the additive inverse of  $x$ . Two numbers with the sum of zero are called additive inverses.

### zero pair

A zero pair is a pair of numbers whose sum is zero. The value of negative 1 plus positive 1 is zero. So, negative 1 and positive 1 together are a zero pair.

# Student Instructions for Logging into Carnegie Learning

1. Click the link to log into [Clever](#)
2. Click “Login with your BPS username and password”



3. Enter your BPS username and password
4. Scroll down to the “Math” section and click on “Carnegie Learning”



5. From the MyCL portal page, click the MATHia button that has your class name listed above it.
6. Students can now navigate to the next content. If this is the first time logging in, the student will start with the “Pre-Launch Protocol” which is a tutorial for how to use MATHia
  - a. The link below is a user’s guide for students on navigating MATHia

[MATHia User’s Guide](#)