

Introduction

In this activity, students explore addition and subtraction of integers.

Grades 6-8

NCTM Number and Operations Standards

- Understand meanings of operations and how they relate to one another
- Understand the meaning and effects of arithmetic operations with fractions, decimals, and integers

Files/Materials Needed

Number Line.act

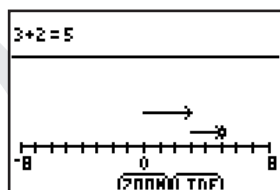
PART 1 INTEGER ADDITION AND OPPOSITE SIGNS

1

- Launch TI-Navigator™ on the computer and start the session.
- Have each student log into NavNet on their calculator.

2

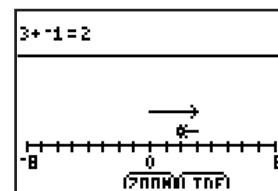
- Load the *Number Line.act* activity settings file. This prompts student calculators to display a number line (from -8 to 8) along with the addition problem $3 + 2$.
- Start the activity and ask students to **MARK** and draw a vector from 0 to 3, press **[ENTER]**, and **MARK** and draw a vector from 3 to 5. Next, have students press **[WINDOW]**, enter the result when adding 3 and 2, and press **[GRAPH]** to **SEND** the result into Activity Center.



- Reference the vectors that were submitted to Activity Center to explain how vectors can be used to represent integer addition.

3

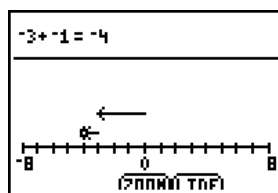
- Stop the activity, click **Configure**, and change the prompt to $3 + 1$.



- Start the activity and repeat parts (b) and (c) from the previous step.
- Repeat steps (a) and (b) using $3 + 0$ and $3 + (-1)$.
- Show students how to use vectors to add two numbers with opposite signs as seen in the diagram below.
- Repeat this activity several times until students are comfortable using vectors to find the sum of integers with different signs. Make sure that you include examples in which the first number is negative and the second number is positive.

Number Line

- f. If students are ready, send some **Quick Poll** questions in which students are asked to find the sum of two integers with different signs without using the vector model.



PART 2 THE SUM OF TWO NEGATIVE INTEGERS

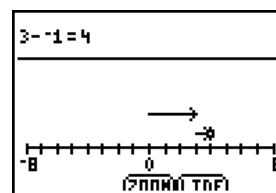
4

- Repeat the procedures described in Part I for the sums $-3 + 2$, $-3 + 1$, $-3 + 0$, and $-3 + -1$.
- Reference the vectors that represent $-3 + -1$ to explain to students how vectors can be used to represent integer addition in which both numbers are negative.
- Repeat this activity several times until students are comfortable using vectors to find the sum of two negative integers.
- If students are ready, send some **Quick Poll** questions in which students are asked to find the sum of two negative integers without using the vector model.

EXTENSION

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- Subtraction of integers can also be explored using the number line in Activity Center. Use patterns such as $3 - 2$, $3 - 1$, $3 - 0$, $3 - (-1)$ to show how to subtract a negative number.



- By investigating vector patterns, students will more readily accept the fact that the second vector used to represent $3 - (-1)$ has length one unit and must point right.
- You may decide to use this discussion to develop the rule $a - b = a + -b$.
- Make sure that you experiment with other variations of integer subtraction including negative minus positive, negative minus negative, and positive minus positive. Challenge students to write verbal rules for each of these cases.
- If students are ready, send some **Quick Poll** questions in which students are asked to find the difference of two integers without using the vector model.