

“Additive Inverse” Classroom Activities

Short Description: Learn the meaning of the term additive inverse, in this animated “Math Shorts” video.

Long description: This animated “Math Shorts” video explains the term additive inverse and provides several examples that demonstrate the concept. In the accompanying classroom activity, students create equations and solve problems that involve adding groups of negative and positive integers that sum to zero. To get the most out of this activity, students should be familiar with plotting positive and negative integers on a number line.

Activity Text

Learning Outcomes

Students will be able to

- define additive inverse and demonstrate its meaning with an equation
- write equations and solve problems that involve adding negative and positive integers
- provide real-life examples of additive inverses, such as travelling an equal distance in opposite directions or gaining and losing equal amounts of money

Common Core State Standards: 7.NS.A.1b

Vocabulary: additive inverse

Materials: For each student pair: a piece of graph or plain paper for drawing number lines and recording; two number cubes or dice, one with numbers 1–6 and one altered to show positive and negative signs. (To alter the dice, put a piece of masking tape on each face. On three faces, write “+” and on the other three write “-“.)

Preparation: Alter the dice with positive and negative signs, as described above.

Procedure

1. Introduction and video (5–10 minutes, whole group)

Explain that the group will be working with positive and negative integers. Engage students in a quick review of using a number line to add small positive and negative integers. Sketch a number line on the board and ask questions such as, How would you use the number line to show the sum of -1 and 3? -3 and 3?

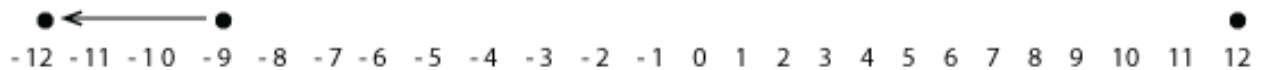
Then, play the [Additive Inverse] video.

After watching the video, write $(+10) + (-10) = 0$ on the board.

Ask students for ideas on what the equation could represent. Tell them to come up with a word problem for the equation using one of the examples of additive inverses from the video. They may also come up with one of their own. For example, they might suggest starting at home, walking 10 blocks in one direction, and then returning back home the same way; taking a bus 10 stops in each direction; or gaining and losing \$10.

Next, offer another equation, this one involving three addends, one of which is unknown: $(+12) + (-9) + \underline{\quad} = 0$. Ask students for ideas for a word problem to represent this equation and for its solution.

Use the number line to demonstrate that the positive number and negative totals are additive inverses:



2. Zero sum stories (10 minutes, pairs)

Divide students into pairs, and demonstrate the activity. The goal is to come up with an equation that is equal to 0.

- Roll the “sign” die, then roll the “number” die. Record the results of the rolls, in parentheses, followed by a “+” sign. (Sample rolls: +, 4)

$$(+4) +$$

- Repeat. (Sample rolls: -, 3)

$$(+4) + (-3) +$$

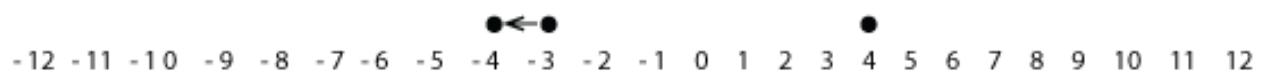
- Form an equation with one unknown, by adding “ ” and “= 0”

$$(+4) + (-3) + \underline{\quad} = 0$$

- Complete the equation, by filling in the unknown.

$$(+4) + (-3) + \underline{(-1)} = 0$$

- Plot the equation on a number line to demonstrate that the positive and negative totals are additive inverses.



Note: If you don't end up with a negative and a positive number the first time, demonstrate by turning the "sign" dice so that you get one of each.

Distribute two dice and paper to each student pair. Ask students to create and solve three equations as you demonstrated. For one equation, have them create a short word problem.

3. Conclusion (5 minutes, whole group)

Invite student pairs to share some of the word problems they created. For additional practice, student pairs could exchange and solve the word problems they created.

Activity Extension: Repeat the activity using a fraction cube, or tape over three faces on the number cube and replace with fractions such as $\frac{1}{2}$, $\frac{3}{2}$, and $\frac{5}{2}$.