
Math Mammoth Integers

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Introduction

Math Mammoth Integers worktext covers all the important integer topics for middle school (grades 6-8), with instructions written directly to the student, so it requires very little teacher involvement.

Integers are introduced using the number line to relate them to the concepts of temperature, elevation, and money. We also study briefly the ideas of absolute value (an integer's distance from zero) and the opposite of a number.

Adding and subtracting integers is presented through two main models: (1) movements along the number line and (2) positive and negative counters. With the help of these models, students should not only learn the shortcuts, or "rules," for adding and subtracting integers, but also understand *why* these shortcuts work.

A lesson about subtracting integers explains the shortcut for subtracting a negative integer using three different viewpoints (counters, number line movements, and as a distance or difference). There is also a roundup lesson for addition and subtraction of integers.

Next, students learn to locate points in all four quadrants and how the coordinates of a figure change when it is reflected across the x or y -axis. Students also move points according to given instructions, and find distances between points with the same first coordinate or the same second coordinate.

Multiplication and division of integers is explained, first of all using counters, and then relying on the properties of multiplication and division. We use multiplication and division in the context of enlarging or shrinking geometric figures in the coordinate grid. These lessons also include a few simple equations, problems with several operations, and fun riddles.

The last section of lessons in this book deal with graphing. Students plot points on the coordinate grid according to a given equation in two variables (such as $y = x + 2$), this time also using negative numbers. They see the patterns in the coordinates of the points and the pattern in the points drawn in the grid, and also work through some real-life problems.

The book ends with two review lessons.

*Wishing you success in all your math teaching endeavors,
Maria Miller, the author*

Helpful Resources on the Internet

Use these free online resources to supplement the “bookwork” as you see fit.

Free worksheets for the Coordinate Grid

Generate printable & customizable worksheets for plotting points & shapes, and for moving and reflecting shapes in the coordinate grid. Options include choosing either the first or all quadrants, scaling, image size, workspace, and border.

http://www.homeschoolmath.net/worksheets/coordinate_grid.php

Ordering integers

Number Balls Game

Click on the rotating number balls in the ascending order.

<http://www.mathplayground.com/numberballs.html>

Negative Numbers Hat Game

Put the hats with numbers on the people’s heads in the right order.

<http://www.primaryresources.co.uk/online/negnumorder.swf>

Order Negative Numbers

Drag and drop the numbers in the right order onto the ladder (scroll down the page a bit to see the activity).

http://www.bbc.co.uk/bitesize/ks3/maths/number/negative_numbers/revision/2/

Addition and subtraction

The section for “all operations” below has more games for adding and subtracting.

Color Chips Addition

The user drags positive/negative chips to the working area, then combines them in pairs to see the sum.

http://nlvm.usu.edu/en/nav/frames_asid_161_g_2_t_1.html

Color Chips Subtraction

Drag positive/negative chips and zero pairs into working area as instructed, then subtract.

http://nlvm.usu.edu/en/nav/frames_asid_162_g_3_t_1.html

Integer Football

The football player advances either towards the positive or the negative yard lines.

http://www.mathgoodies.com/games/integer_game/football.html

Line Jumper

You see a number line and an addition or subtraction problem. Click the right answer on the number line.

<http://www.funbrain.com/linejump>

Space Coupe to the Rescue

By choosing a positive or negative number, the player controls the vertical position of a spaceship. If the spaceship reaches the same vertical position as a virus pod, the pod is destroyed.

<http://pbskids.org/cyberchase/games/negativenumbers>

Red and Black Triplematch Game for Adding Integers

This is a fun card game with 2-5 people to practice adding integers.

<http://mathmamawrites.blogspot.com/2010/07/black-and-red-triplematch-card-game-for.html>

Adding and Subtracting Integers Gizmos from Explorelearning.com

Interactive simulations that illustrate adding and subtracting integers on a number line or with chips. Includes an exploration guide and assessment questions. You can get a 5-minute access for free, or a free 30-day trial account.

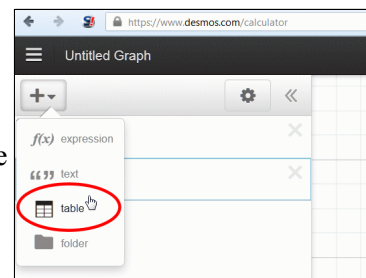
<http://www.explorelearning.com/index.cfm?method=cResource.dspResourcesForCourse&CourseID=211>

Graphing

Desmos Graphing Calculator

A versatile, easy-to-use, and free graphing calculator. To practice plotting points and lines as learned in this chapter, add an item from the + button and choose "table." Fill in x and y values, and Desmos will plot the points. You can then type the equation of the line in the form $y = (\text{something})$, such as $y = 2x$, and check if the line goes through your points.

<https://www.desmos.com/calculator>



Meta-Calculator 2.0

Choose Graphing Calculator. You can enter an equation to be graphed, or choose "plot points" from top menu to enter individual points.

<http://www.meta-calculator.com/online/>

Graph Mole

A fun game about plotting points in coordinate plane. Plot points before the mole eats the vegetables.

<http://funbasedlearning.com/algebra/graphing/default.htm>

Catch the Fly

Wait for the fly to land on the coordinate grid, then type its coordinates, and a frog will eat it.

http://hotmath.com/hotmath_help/games/ctf/ctf_hotmath.swf

Looking for the Top Quark Game

Each player receives six quarks that they hide on a grid. The players use coordinates to find their opponent's hidden quarks.

<http://education.jlab.org/topquarkgame>

Coordinate Grid Quiz from ThatQuiz.org

This quiz has 10 questions and asks to either plot a point or give the coordinates of a given point. You can also modify the quiz parameters to your liking.

<http://www.thatquiz.org/tq-7/?-j8-l5-m2kc0-na-p0>

Co-ordinate Game

You will see a red circle on the grid. Enter its co-ordinates and click check.

http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks3/maths/coordinate_game/game1.htm

Multiplication and division

The section for “all operations” has more games that practice multiplication and division.

Integer Warp (Race)

A one-minute race with up to four spaceships (players). Answer integer multiplication problems correctly to speed up your spaceship.

<http://www.arcademicskillbuilders.com/games/integer-warp/integer-warp.html>

Integers Multiplication Blocks

Click on numbers whose product is equal to the given target number. Score as high as you can in the given time limit.

<http://www.xpmath.com/forums/arcade.php?do=play&gameid=58>

Integers Multiplication -144 to 144

Solve as many integer multiplication problems as you can within one minute with these online flashcards.

<http://www.xpmath.com/forums/arcade.php?do=play&gameid=17>

Integers Division -81 to 81

Solve as many integer division problems as you can within one minute with these online flashcards.

<http://www.xpmath.com/forums/arcade.php?do=play&gameid=16>

All operations / General

Arithmetic Four (Connect the Four game)

Practice any or all of the four operations with integers. First you answer a math problem, then you move in a connect-the-four game.

<http://www.shodor.org/interactivate/activities/ArithmeticFour>

Flashcards with Negative Numbers

Interactive flashcards at AplusMath.com for integer addition, subtraction, multiplication, and division.

<http://www.aplusmath.com/Flashcards/sub-nflash.html>

Create Integers Worksheets

Use the basic operations worksheet generator for integer worksheets by choosing the range of numbers to be from negative to positive.

<http://www.homeschoolmath.net/worksheets/basic-operations-worksheets.php>

How to Teach Integers

An article for the teacher about how to teach integer operations.

<http://www.homeschoolmath.net/teaching/integers.php>

Free Downloadable Integer Fact Sheets

http://www.homeschoolmath.net/download/Add_Subtract_Integers_Fact_Sheet.pdf

http://www.homeschoolmath.net/download/Multiply_Divide_Integers_Fact_Sheet.pdf

The History of Negative Numbers

While they seem natural to us now, in the past negative numbers have spurred controversy and been called “fictitious” and other names.

http://nrich.maths.org/public/viewer.php?obj_id=5961

http://www.classzone.com/books/algebra_1/page_build.cfm?content=links_app3_ch2&ch=2