



# *The Math Inventory* Software Manual

For use with *The Math Inventory* version 2.5 or later  
and Student Achievement Manager version 2.5 or later

PDF0953 (PDF)

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## Introduction

*The Math Inventory*, formerly *Scholastic Math Inventory*, is a computer-adaptive assessment that measures student math achievement and reports results based on the Quantile® Framework for Mathematics. This software manual explains *The Math Inventory* and describes the student test-taking experience.

*The Math Inventory* works with SAM Central, the new teaching management system. Users upgrading from earlier versions of *The Math Inventory* will recognize the Student Achievement Manager (SAM), formerly the Scholastic Achievement Manager, functions in SAM Central, along with many new, innovative features that will provide teachers with tools and resources needed for effective teaching and successful implementation.

Like SAM, SAM Central allows teachers and administrators to enroll students in programs, customize program settings, schedule and run reports, and access education and professional development resources. SAM Central also takes student and class data from SAM and presents it in graphic, tabular, and dynamic ways to provide a detailed status of student performance and usage that is updated in real time.

For information on *Math Inventory* program settings and on generating *Math Inventory* reports, see [Using SAM Central With The Math Inventory](#). For information on installing *Math Inventory* software, see [The Math Inventory Installation Guide](#). For other information, see the chart below. All manuals are available at the [Math Inventory Product Support](http://hnhco.com/mi/productsupport) website ([hnhco.com/mi/productsupport](http://hnhco.com/mi/productsupport)).

| For information on:  | Download this manual:   |
|--|---|
| <i>Math Inventory</i> program settings and generating <i>Math Inventory</i> reports in SAM | <a href="#">Using SAM Central With The Math Inventory</a>                         |
| Installing <i>Math Inventory</i> software  | <a href="#">The Math Inventory Installation Guide</a>                             |
| Getting started with SAM and setting up accounts at the district and school levels         | <a href="#">Getting Started With Student Achievement Manager</a>                  |
| Adding and enrolling students in SAM   | <a href="#">Enrolling and Managing Students Using Student Achievement Manager</a> |
| SAM Resources  | <a href="#">Using Resources in Student Achievement Manager</a>                    |
| Using SAM Connect  | <a href="#">SAM Connect User's Guide</a>  |
| Using SAM services, functions, and data  | <a href="#">SAM Data Management Manual</a>  |
| Using Hosting Services   | <a href="#">Hosting Services User's Guide</a>                                     |

## **Student Accessibility**

*The Math Inventory* provides accessibility features that can enable some visually impaired students to use the application. The contrast setting, for example, will help a student who has trouble reading black text on a white background.

*The Math Inventory* does not provide textual equivalence to bitmap-rendered content. Students who are dependent on a Braille or text-to-speech device will be unable to use the application. Also, though closed captions are available for the hearing impaired, the application does not provide a description of the video, nor does it provide the closed-caption text in text format (it is available only as a display).

Browser-based accessibility features, such as screen and font magnifiers, are not tested by Houghton Mifflin Harcourt and may not be compatible with *The Math Inventory*. Even in cases when the features may work with the program, the input focus is not set to allow students using screen magnifiers to follow the onscreen changes. Similarly, changing display settings may render the program unusable. Students needing to see larger text should use an external screen magnifier rather than change display settings or use a feature of the browser program.

Mac OS X and Windows operating systems, as well as Internet Explorer, Firefox, and Safari browser programs, offer a range of accessibility features that may enable users with disabilities to, among other things, perform basic navigation with a keyboard instead of a mouse by using the tab key.

## Overview

*The Math Inventory* is an adaptive assessment that measures math achievement and growth from kindergarten to Algebra II, based on the Quantile Framework.

*The Math Inventory* has a bank of over 5,000 test items across the strands of mathematics as defined by the National Council of Teachers of Mathematics. The strands are: number and operations; algebraic thinking; pattern and proportional reasoning geometry; measurement and data; statistics and probability; and expressions and equations, algebra, and functions. Results are reported in both criterion-referenced and norm-referenced terms, indicating students' mathematical achievement levels on a universal scale as well as measuring their results against those of their peers.

*The Math Inventory* has three parts: the Early Numeracy screener (kindergarten and Grade 1) or Fact screener (Grades 2 and higher), the Practice Test, and the MI Scored Test. Upon completing the MI Scored Test, students receive their Quantile® measures. Students' Quantile measures are automatically recorded in SAM. Teachers and administrators may view and use this data in SAM Central to evaluate student performance, monitor progress, identify student needs, and generate reports (for more information see [Using SAM Central With The Math Inventory](#) at the [Math Inventory Product Support](http://mhco.com/mi/productsupport) website, [mhco.com/mi/productsupport](http://mhco.com/mi/productsupport)).

## Math Inventory Assessments

*The Math Inventory* contains two types of assessments that cover kindergarten through Algebra II. Both assessments align to state standards. Students take only the assessment appropriate for their grade level.



### Teacher Tip

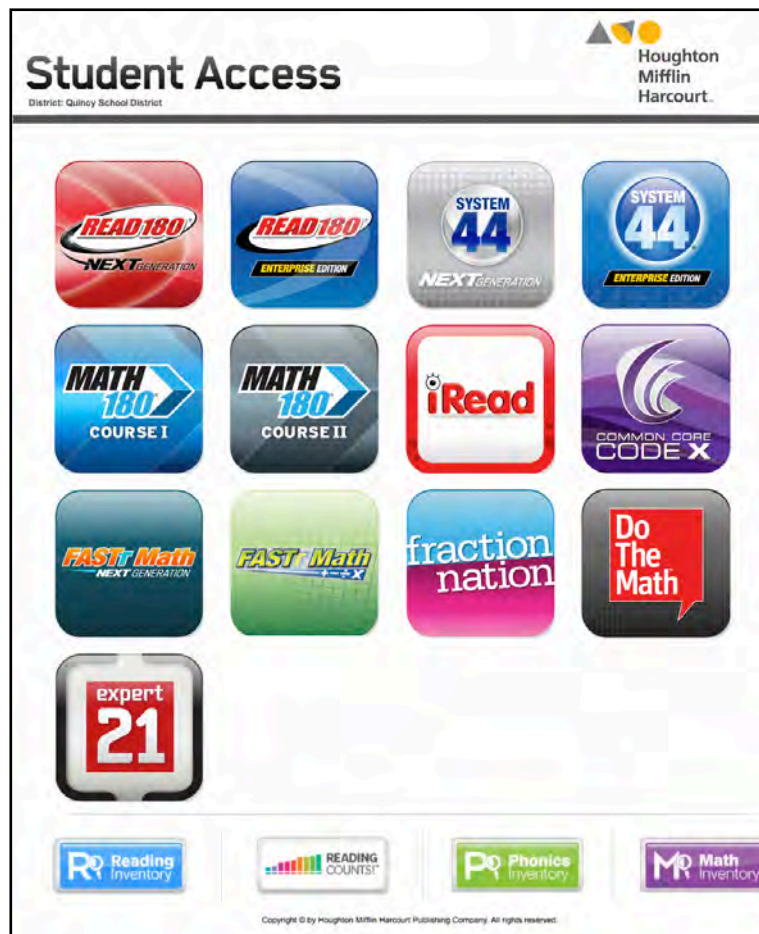
Before students take the Math Inventory test, review test-taking strategies and the format of the computer-based assessment for more accurate results. See the *Professional Learning Guide* for suggestions.

## Logging In

### Student Access Screen

Students are enrolled in *The Math Inventory* through Student Achievement Manager (SAM). See [Enrolling and Managing Students Using Student Achievement Manager](#) for detailed instructions on enrolling students.

Once students are enrolled in *The Math Inventory*, they may log in to the program through the Student Access screen on the student workstation or mobile device. To open the Student Access screen, open the workstation's browser program and use the Student Access screen bookmark (see [The Math Inventory Installation Guide](#) for help with bookmarking the Student Access screen).

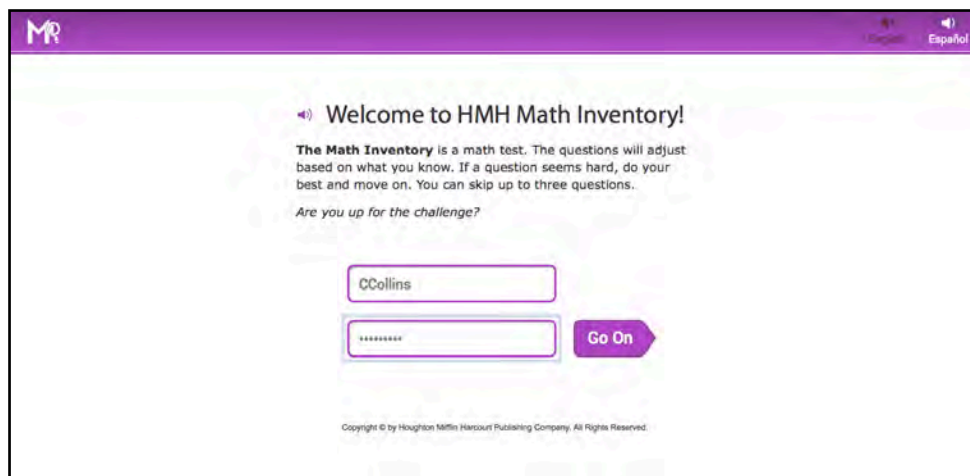


The Student Access screen displays icons for all of the district's SAM Suite programs. To open the *Math Inventory* Login screen, click the *Math Inventory* icon at the bottom of the screen.



Students using *The Math Inventory* with *MATH 180* may also access *The Math Inventory* from the *MATH 180* access screen. Click the *Math Inventory* icon to go to the Login screen.

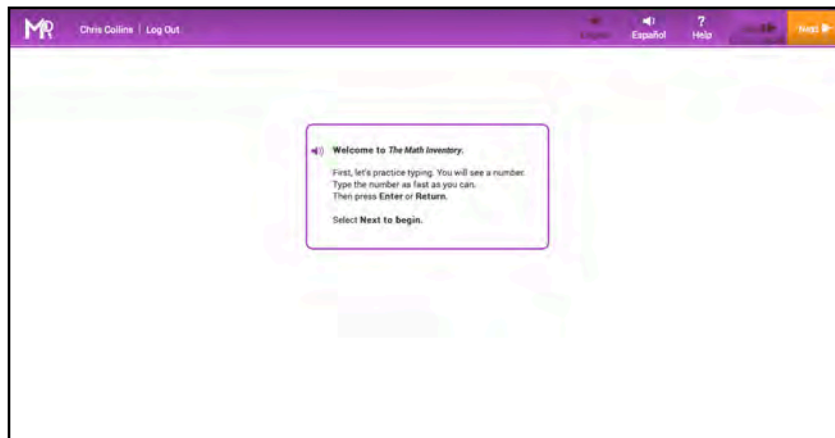
## The Login Screen



The screenshot shows the login interface for HMH Math Inventory. At the top, there is a purple header bar with the 'MR' logo on the left and 'English' and 'Español' language options on the right. The main content area has a light green background with a faint math problem. The text reads: 'Welcome to HMH Math Inventory!', 'The Math Inventory is a math test. The questions will adjust based on what you know. If a question seems hard, do your best and move on. You can skip up to three questions.', and 'Are you up for the challenge?'. Below this, there are two input fields: the first contains the username 'CCollins' and the second is a password field with masked characters. To the right of the password field is a purple 'Go On' button. At the bottom, a small copyright notice states: 'Copyright © by Houghton Mifflin Harcourt Publishing Company. All Rights Reserved.'

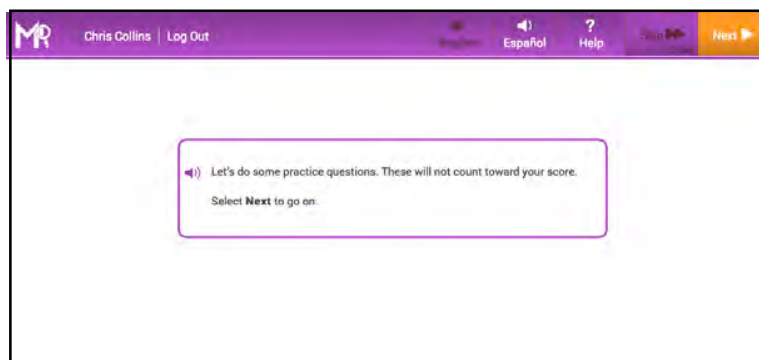
From the Login screen, students type their usernames and passwords and click **Go On** to start the test.





After students log in, they see an introduction screen that displays instructions for the part of the *Math Inventory* assessment they are about to begin. The instructions are also read aloud. Click the speaker icon to hear the instructions read again. The screen also shows the basic commands that appear throughout the program:

- **English:** Click to have onscreen directions shown and audio directions read in English. This is the default setting.
- **Español:** Click to have onscreen directions shown and audio directions read in Spanish.
- **Help:** Click for audio help with using the program.
- **Skip:** Click to skip the question. Students may skip up to three questions in the Math Inventory Scored Test; skipped questions do not count against a student's measure.
- **Next:** Click to go on to the next screen or question.



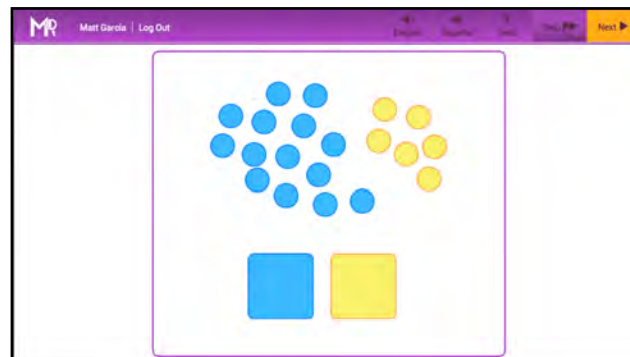
Students in kindergarten and Grade 1 see simpler on-screen instructions along with audio directions.

After reading the instructions, students click **Next** to go to their appropriate screener.

## Using *The Math Inventory*

*The Math Inventory* has three parts: the Early Numeracy screener (Kindergarten and Grade 1) or Fact screener (Grades 2 and higher), the Practice Test, and the MI Scored Test.

### Early Numeracy Screener



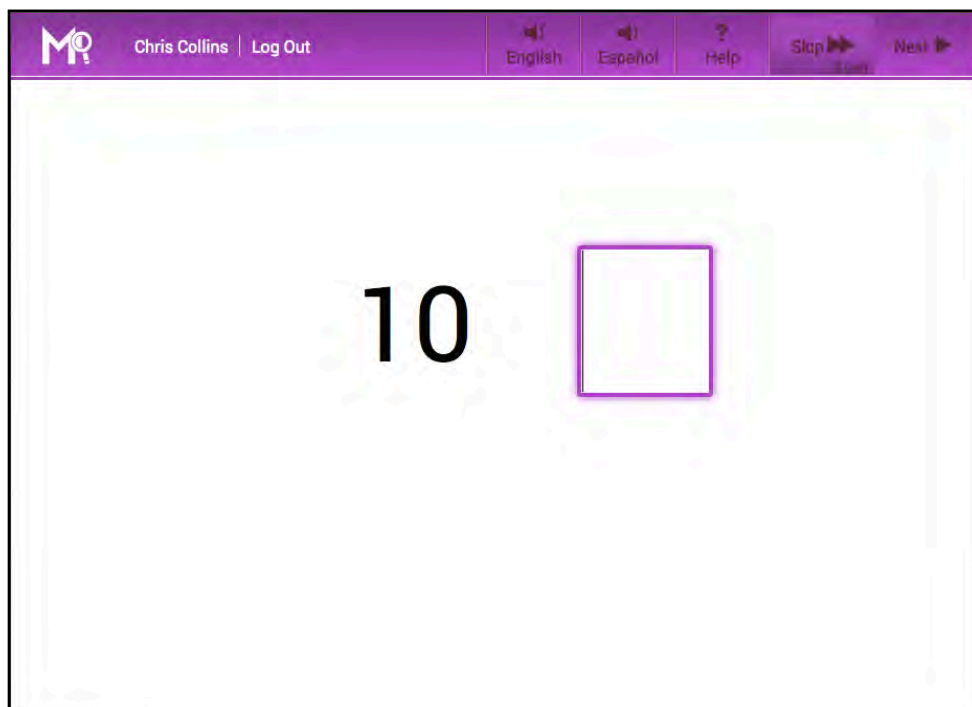
The Early Numeracy screener asks students in Kindergarten and Grade 1 to count and identify numerals and make quantity comparisons; it also measures students' ability to use the computer and pointer. It also includes simple instructions read aloud that explain the importance of answering the questions quickly to demonstrate fluency.

In the first part of the Early Numeracy screener, students are asked to select the correct number of stars they see on the screen by clicking the number. In the second part of the screener, students are asked to choose which group of tiles contains more tiles by choosing the corresponding color's field at the bottom of the screen.

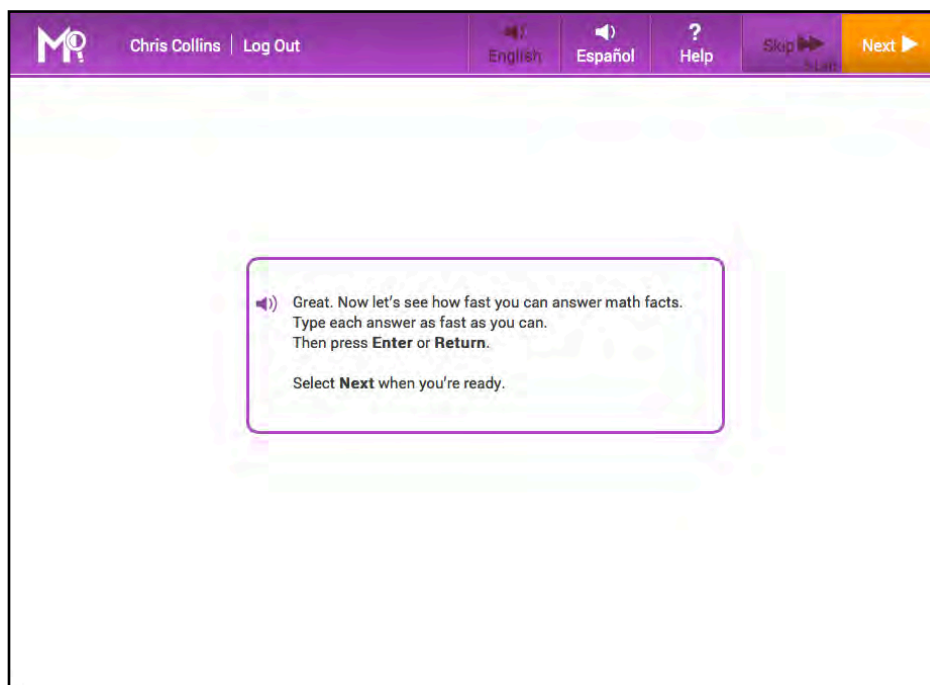
Students who do not measure sufficiently on the screener see a message to discuss their results with their teacher, who may then determine if the student should take the Early Numeracy screener again.

## Fact Screener

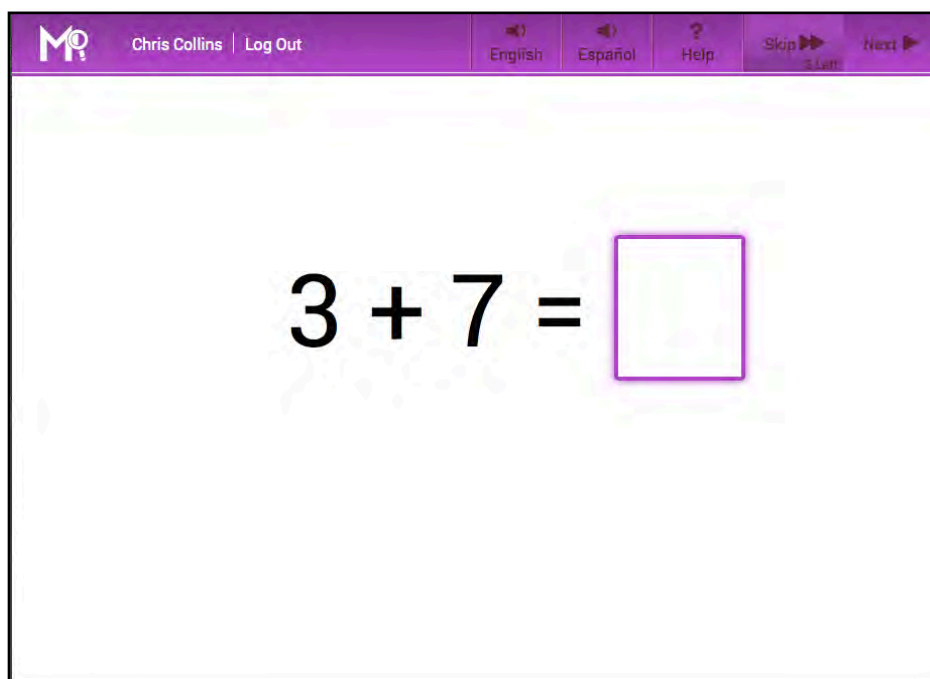
The Fact screener identifies students in Grades 2 and higher who may need work on math fact fluency. It is made up of a Typing Warm-Up and an Addition Fact screener, and students in Grades 4 and up also see a Multiplication Fact screener. The Fact screener also includes simple instructions, both written and read aloud, that explain the importance of answering math facts quickly to demonstrate fluency.



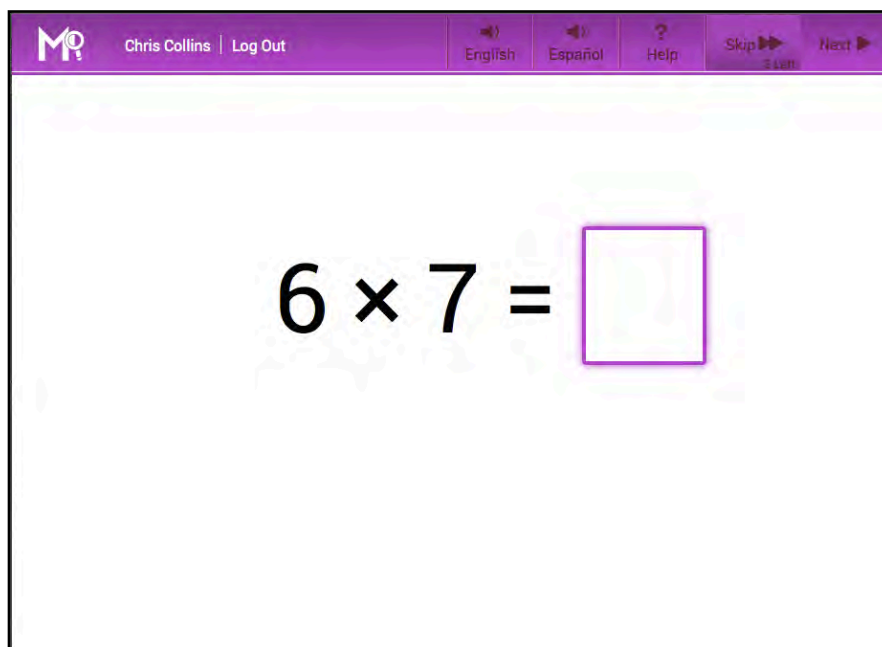
In the Typing Warm-Up, students practice typing numbers as fast as they can to get comfortable finding numbers on the keyboard or number pad and typing them quickly. Students are asked to type four numbers. After typing each number, they click **Next** to go on to the next number.



After finishing the Typing Warm-Up, students are instructed to move to the Addition Fact screener and Multiplication Fact screener.



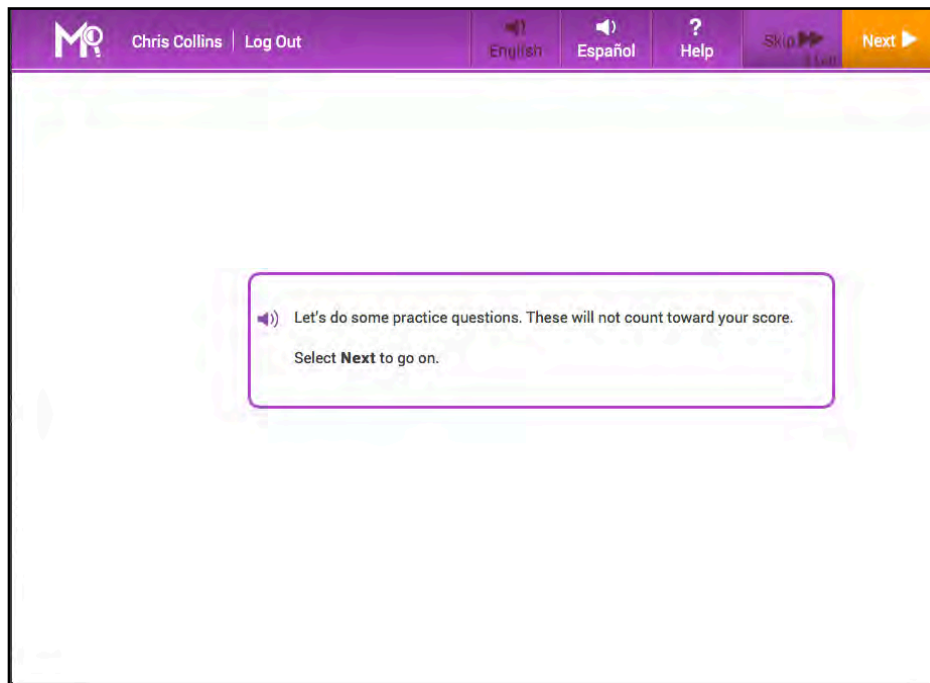
In the Addition Fact screener, students answer 10 addition facts as quickly as they can. Students type an answer and click **Next** to go to the next fact.



The screenshot shows the Math Inventory Multiplication Fact screener interface. At the top, there is a purple header bar with the M<sup>Q</sup> logo, the user name "Chris Collins", a "Log Out" link, and buttons for "English", "Español", "Help", "Skip", and "Next". The main area is white and displays the multiplication fact  $6 \times 7 =$  followed by a large, empty square box for the student to enter the answer.

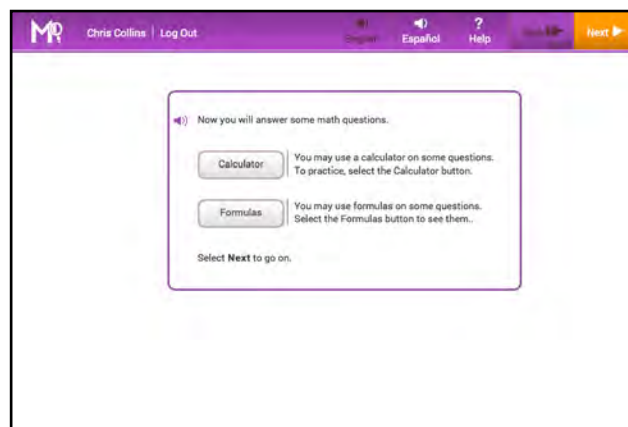
In the Multiplication Fact screener, students in Grades 4 or higher answer 10 multiplication facts as quickly as they can. Students type an answer and click **Next** to go to the next fact. After the last fact, clicking **Next** takes students to the Practice Test. The results of the Fact screener are recorded in SAM. These results indicate which students may need work on fact fluency and which students are fluent on the tested facts in addition or multiplication.

## Practice Test



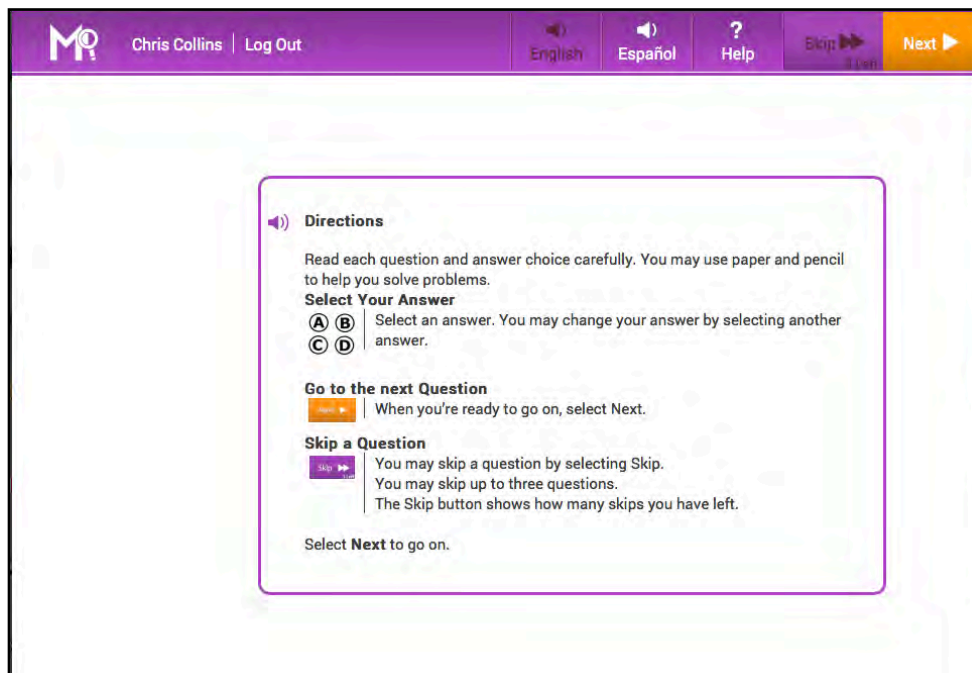
The Practice Test prepares students for the Scored Test by determining if students understand how to use the computer to answer questions. The Practice Test familiarizes students with the program, the calculator, and the *Math Inventory* formula lists. Practice Test answers do not count toward students' final Quantile measures.

Students in Grades 3 and higher may practice using the calculator ([page 20](#)) by clicking the **Calculator** button and review the formulas ([page 21](#)) by clicking the **Formulas** button prior to beginning the Practice Test.



### Teacher Tip

This screen is not visible if the district administrator has disabled the calculator and formula features.



After clicking **Next**, students see an instruction screen that describes the basic functions of the assessment. The instructions are also read aloud. To disable the audio instructions, click the speaker icon.

Kindergarten and Grade 1 students receive only audio instructions.

To hear the audio instructions read aloud in Spanish, and see Spanish on-screen instructions, click **Español**.

Click **Next** to move to the first question.

Chris Collins | Log Out

English Español ? Help Skip Next

**Practice Item**

How many circles?

(A) 2  
(B) 3  
(C) 4  
(D) 5

Calculator Formulas

Matt Garcia | Log Out

English Español ? Help Skip Next

**Practice Item**

Which shape is a circle?

(A) [square] (B) [rectangle]  
(C) [triangle] (D) [circle]

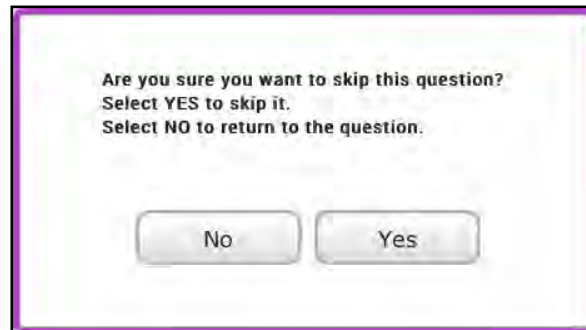
Calculator Formulas

The Practice Test in both assessments consists of three to five questions. Practice Test questions are targeted to allow students to answer without difficulty. All questions are multiple choice, with four answer choices. To select an answer:

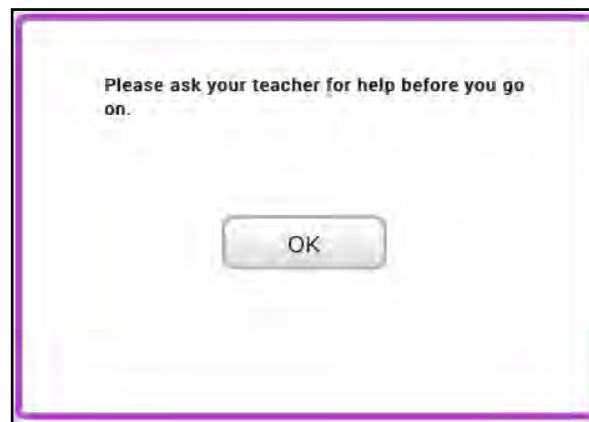
1. Click an answer from the list of choices to select it.
2. Click **Next** to record the answer choice and advance to the next question.

To change an answer, click a different answer choice before clicking **Next** or pressing Enter or Return. Students may not go back to a question to change the answer once they have submitted it.





Students may skip up to three questions in the Scored Test. Clicking **Skip** opens a confirmation screen. Click **Yes** to skip the question or **No** to return to the test. The **Skip** button shows how many skips the student has left.



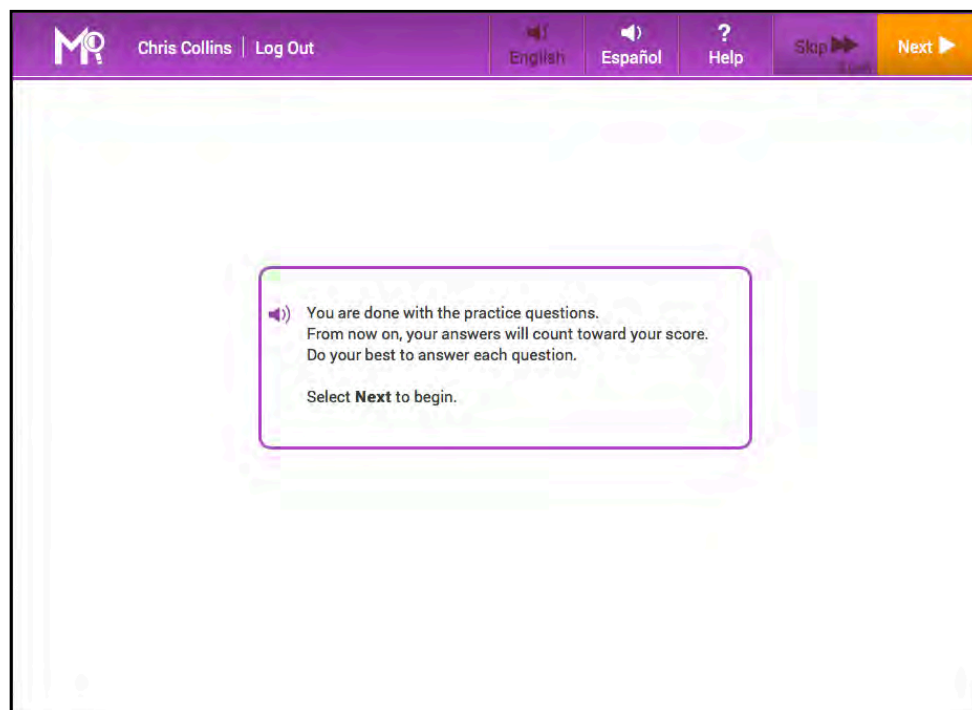
Students who answer any of the first three practice questions incorrectly see a message prompting them to seek help from their teacher. Students may be having difficulty navigating the keyboard, understanding the questions or the format of the test, or processing the instructions. Once teachers have addressed these or other issues, students may click **OK** to answer two more practice questions. Students may also log out of the Practice Test and return to it when they log back in to *The Math Inventory*.



### **Teacher Tip**

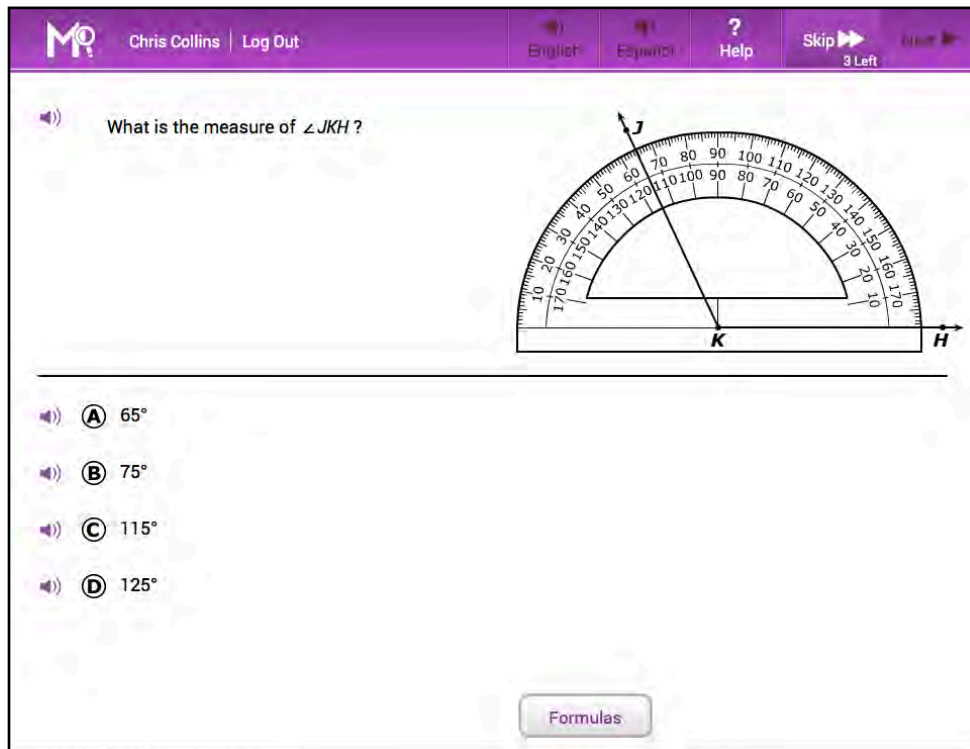
Students see only the Practice Test the first time they take Math Inventory, unless their program settings are set to show the Practice Test every time they take a new test. Students who need to pause the Practice Test may continue the test the next time they log in.

## The Scored Test



When students finish the Practice Test, they are prompted to begin the Scored Test. Students are reminded that from this point on all answers count toward the *Math Inventory* measure. Students click **Next** to begin the Scored Test or the speaker icon to hear the instructions again.

Students who answer a question incorrectly in less than five seconds see a message encouraging them to focus on the question.



The Scored Test consists of 25–45 questions across the mathematics strands: number and operations; algebraic thinking; pattern and proportional reasoning; geometry; measurement and data; statistics and probability; and expressions and equations, algebra, and functions. *The Math Inventory* is adaptive and measures students' responses as they move through the Scored Test. The Scored Test follows a strand profile based on grade, and students' questions follow the profile. Each question's difficulty level is based on whether the student has correctly or incorrectly answered the preceding question. As with the Practice Test, all questions are multiple choice, with four answer choices.

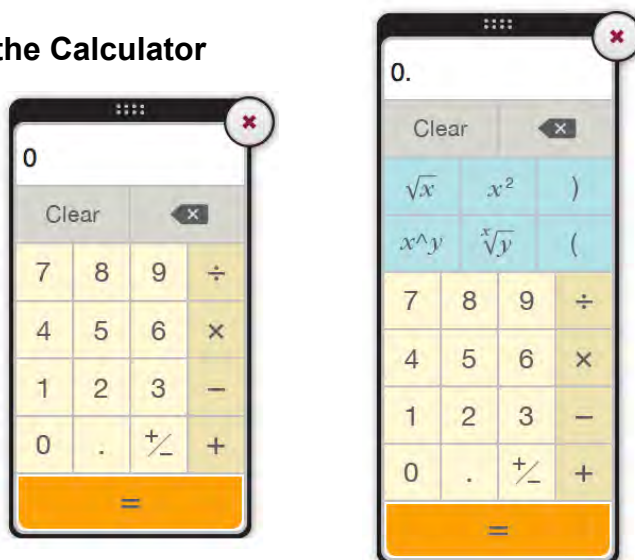
To select an answer:

1. Click an answer from the list of choices to select it.
2. Click **Next** to record the answer choice and advance to the next question.

To hear the question or the answer choices read aloud, click the audio icons.

Students may change an answer by clicking a different choice before clicking **Next** or pressing **Enter** or **Return**. They may not change a submitted answer. When students answer enough questions to determine a Quantile measure, the Scored Test ends.

## Using the Calculator



The *Math Inventory* includes two types of onscreen calculators. The type of calculator provided depends on the difficulty of the question. Students see a four-function calculator for questions written for grades up to Grade 5; for Grades 6 and higher, students use the scientific calculator.

The calculator is not available for every question. On the Scored Test, the calculator is disabled for questions that measure students' calculation skill. Users with administrator permissions may disable the calculator for *all Math Inventory* items or for all students in a school or district. Without the use of a calculator, students may find that problems are harder than expected, which may affect the students' measures.

Students may practice using the calculator before and during the Practice Test.

To open the calculator, click the **Calculator** button in the lower center part of the screen, or use the keyboard by following these steps:

1. Press the Tab key to activate the keyboard selection process, then highlight the calculator.
2. Press the Space Bar to open the calculator.
3. Click the **X** icon on the calculator to close it.

Students may use the calculator with the mouse, or the computer's keyboard and number pad.

## Using the Formulas

**Perimeter**  
Square:  $P = 4 \times s$   
Rectangle:  $P = (2 \times l) + (2 \times w)$

**Area**  
Square:  $A = s \times s$   
Rectangle:  $A = l \times w$

**Volume**  
Cube:  $V = s \times s \times s$   
Rectangle prism:  $V = B \times h$  or  $V = l \times w \times h$

**Area**  
Triangle:  $A = \frac{1}{2}bh$   
Parallelogram:  $A = bh$   
Trapezoid:  $A = \frac{1}{2}(b_1 + b_2)h$   
Circle:  $A = \pi r^2$   
Circumference of a circle  
 $C = 2\pi r$  or  $C = \pi d$

**Surface Area**  
Prism: SA = sum of the areas of all faces  
Pyramid: SA = sum of the areas of all faces  
Cylinder:  $SA = 2\pi r^2 + 2\pi rh$

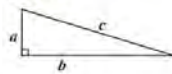
**Volume**  
Cube:  $V = s^3$   
Prism:  $V = Bh$   
Cylinder:  $V = \pi r^2 h$   
Cone:  $V = \frac{1}{3}\pi r^2 h$   
Sphere:  $V = \frac{4}{3}\pi r^3$

**Pythagorean Theorem**  
 $c^2 = a^2 + b^2$

**Pi**  
 $\pi \approx 3.14$  or  $\pi \approx \frac{22}{7}$

**Simple Interest**  
 $I = Prt$

**Pythagorean Theorem**  
 $c^2 = a^2 + b^2$



**Area**  
Triangle:  $A = \frac{1}{2}bh$   
Parallelogram:  $A = bh$   
Trapezoid:  $A = \frac{1}{2}(b_1 + b_2)h$   
Circle:  $A = \pi r^2$   
Circumference of a circle  
 $C = 2\pi r$  or  $C = \pi d$

**Volume**  
Prism:  $V = Bh$   
Cylinder:  $V = \pi r^2 h$   
Cone:  $V = \frac{1}{3}\pi r^2 h$   
Sphere:  $V = \frac{4}{3}\pi r^3$

**Pythagorean Theorem**  
 $c^2 = a^2 + b^2$

**Sum of the interior angles of a polygon with  $n$  sides**  
 $S = (n - 2)(180^\circ)$

**Measure of an exterior angle of a regular polygon with  $n$  sides**  
 $m\angle = \frac{360^\circ}{n}$

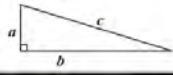
**Compound Interest**  
 $A = P\left(1 + \frac{r}{n}\right)^n$

**Exponential Growth/Decay**  
 $A = A_0e^{k(t-t_0)} + B_0$

**Expected value**  
 $V = p_1x_1 + p_2x_2 + \dots + p_nx_n$

**Quadratic Formula**  
Solution of  $ax^2 + bx + c = 0$  is  

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



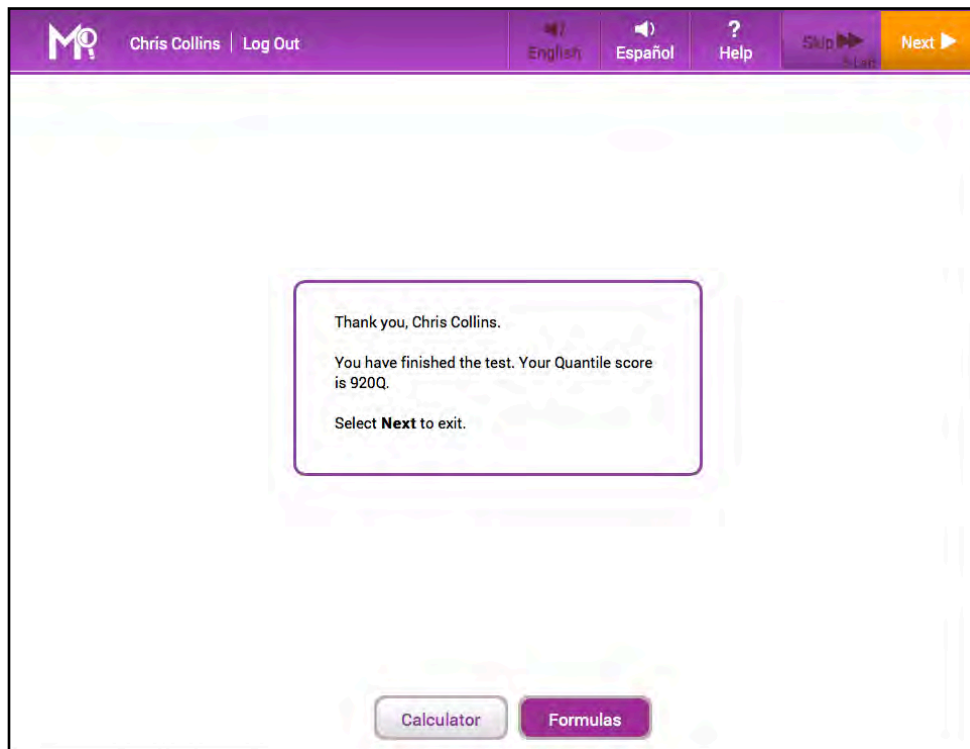
The *Math Inventory* includes three types of onscreen formula lists that contain useful formulas. The type of formula list provided depends on the difficulty of the question. Students see a basic formula list for questions written for Grades 3–5; for Grades 6–8, students see a more detailed list; and students in Grades 9 and higher see a still more detailed formula list.

Users with administrator permissions may disable the formulas for all *Math Inventory* items or for all students in a school or district. Without referring to formulas when appropriate, students may find that problems are harder than expected, which may affect the students' measures.

To open the formula lists, click the **Formulas** button at the lower part of the screen or use the keyboard by following these steps:

1. Press the Tab key to activate the keyboard selection process and highlight the **Formulas** button.
2. Press the space bar to open the formulas.
3. Click the **X** icon on the formula list to close it.

## Completing the Test and Exiting *The Math Inventory*



When students complete the Scored Test, the program displays a Quantile measure for that student. To exit the program, click **Next**.

This closes *The Math Inventory*, and students' measures are recorded in SAM and shown in SAM Central.

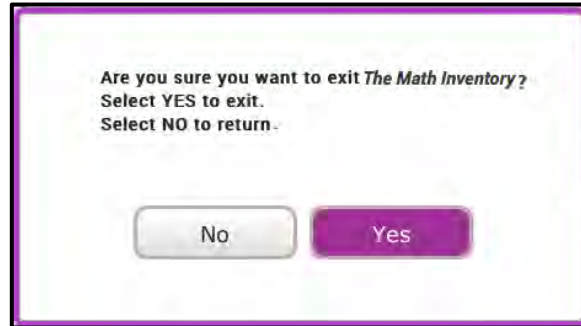


### **Teacher Tip**

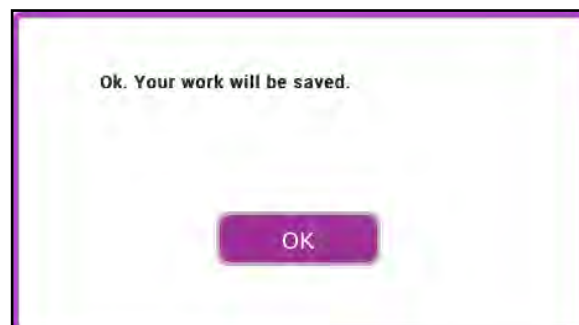
Use the *Math Inventory* Program Settings in SAM to disable displaying Quantile measures onscreen. See [Using SAM Central With The Math Inventory](#) for more information.

## **Saving and Returning to the Scored Test**

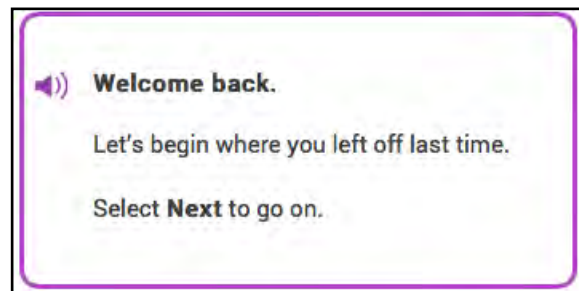
Students who must interrupt their Scored Tests may do so by clicking **Log Out**.



This opens a confirmation window. Students who click **No** return to their work. Students who want to save their results and continue the test at their next login click **Yes**.



Click **OK** from the next screen to exit *The Math Inventory*.



At their next login, students see a screen reminding them that they are starting from the point at which they exited at their last login.

## Math Inventory Mobile Access

The *Math Inventory* is fully compatible with mobile devices that have either Safari or Google Chrome installed.

Teachers and students may access the *Math Inventory* student software either through Safari or Google Chrome or by downloading and configuring the *Math Inventory* app.

### Accessing The Math Inventory With Safari or Google Chrome

To access *The Math Inventory* using Safari or Google Chrome, open the browser and enter the SAM Server URL in the address field, then tap Go from the keyboard. This will open the Student Access screen (page 6). Tap the *Math Inventory* icon from the Student Access screen to move to the login screen (page 8)

### Mobile Device Functionality

The *Math Inventory* functions identically on a workstation or mobile device, with the exception that users tap buttons and links on the user interface, rather than use a mouse or pointer as they do on workstations.

#### Number Pad



In the Fact screener (page 11), a number pad appears onscreen in the mobile app. Tap the numbers to enter an answer, then tap Submit to move to the next question.

To move the number pad, tap and drag it to a different part of the screen.



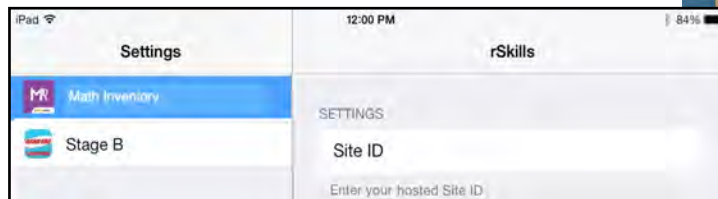
## Downloading and Configuring the *Math Inventory* App

To download and access *The Math Inventory* app, devices must meet the following requirements:

- iPad 2 or later
- iOS version 7.0 or later
- Headphone recommended (available separately)

When these requirements are met, download the *Math Inventory* app from the iTunes App Store.

Prior to opening the app, tap the **Settings** icon on the iPad Home screen.



Tap **The Math Inventory** link from the Settings menu.

In the Site ID field, enter the host ID if the district's SAM Server is hosted by a data center. The host ID is the number that starts with h1 followed by eight digits in the SAM Server URL:

- SAM Server URL: [http://h100000000.\[server name\]](http://h100000000.[server name])
- Host ID: h100000000

If the district SAM Server is locally installed, enter the server URL in the Site ID field:

- [http://\[SAM Server Name or IP Address\]:55880](http://[SAM Server Name or IP Address]:55880)

SAM Server URL information is also available from the district SAM administrator.

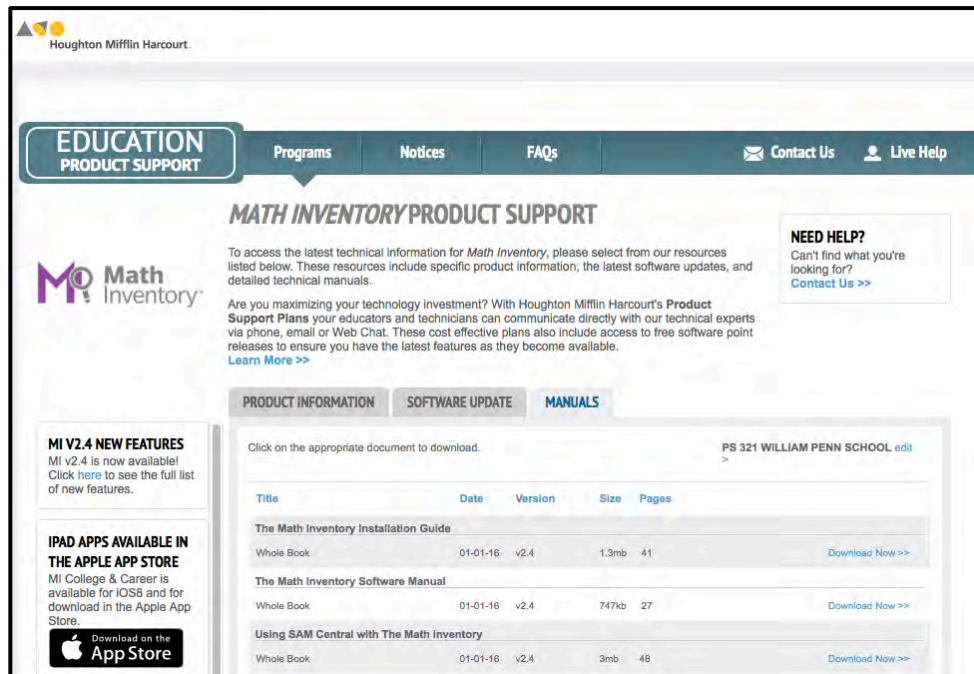
Press the Home button to return to the iPad Home screen. Tap the app to open it and move to *The Math Inventory* login screen (page 8).

## **Guided Access**

Guided Access is an iOS function that allows users to modify their device settings. Teachers and administrators may use Guided Access to control which iPad functions and buttons are enabled or disabled for student use. For more information on accessing and using Guided Access, see the *iPad User Guide* available at [apple.com](http://apple.com).

## Technical Support

For questions or other support needs, visit the [The Math Inventory Product Support](http://hmhco.com/mi/productsupport) website at [hmhco.com/mi/productsupport](http://hmhco.com/mi/productsupport).



At the site, users will find program documentation, manuals, and guides, as well as Frequently Asked Questions and live chat support.

For specific questions regarding *The Math Inventory*, contact customer service to speak to a Houghton Mifflin Harcourt technical support representative at: 1-800-283-5974.

For specific questions about using SAM with *The Math Inventory*, click **Help** in the Quick Links along the top of any screen in SAM.