

CALCULUS 2

STURMANN
MATHEMATIK

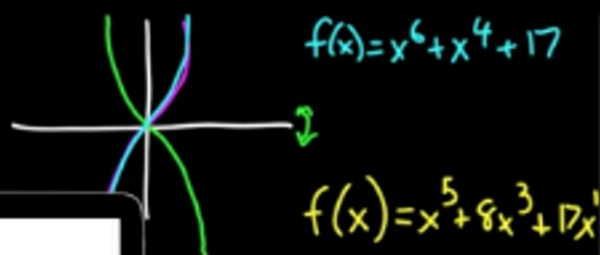
CALCULUS 2

LESSON 16

Type answer according to the type, with one space between the number and the units. For example:
1000 ft, 1000 ft²

Help: Lesson 16, No. 16 a.

16. An engineering drawing of a rectangular
plate with a hole is shown below. The length
of the plate is 100 mm. Find the volume
of the plate, with the hole removed.



Parents: Course Setup & Login

While the instruction, grading, and Q&A support are provided in the course, **a parent or teacher should supervise** to ensure the student follows the course instructions. Don't worry, you don't need to know anything about math! Simply follow these steps:

1. Parents watch **with** your student: [Getting Started](#)
2. **CRITICAL:** Read [Parent Responsibilities & How to Check Student Work](#)
3. Print and read these Instruction Sheets:
 - [Reading Assignment Instruction Sheet](#)
 - [Note-Taking Instruction Sheet](#)
 - [Practice Set Instruction Sheet](#)
 - [Quiz Instruction Sheet](#)
 - [Study for Exams Instruction Sheet](#) - coming soon
4. To ensure your device is setup for our eLearning system, please follow the: [Computer & Device Setup Instructions](#)
5. Read: The [Timed Method](#), & [Family Grading Subscription](#)
6. Required Materials:
 - Select one: [Geometry App or a Ruler & Drawing Compass](#)
 - Select a [Recommended Calculator](#)
 - 2-inch binder and 3-hole paper (blank or college-ruled)
 - Small spiral notebook (4x6) for formulas
 - Computer or tablet with Internet access and headphones or speakers
7. After you receive the login email, follow the steps under **PARENTS** to continue setting up the course. To find out when your login email will be sent, see: [eCampus](#)

Important Resources

[Grade Changes and Resets](#)

[Ask Dr. Shormann a Homework, Test, or Quiz Question](#)

[Contact Tech Support](#)

[NCAA](#)

[Advanced Placement](#)

[Transcripts & Credits](#)

Table of Contents

[Scheduling](#)

Two or Three Semester Course

[Timed Method - Recommended Scheduling](#)

- [Don't Expect Immediate Mastery](#)
- [Focus on Fluency](#)

[Parent Responsibilities](#)

Quick Start Guide (coming soon)

Assignment Chart (coming soon)

[Credits](#)

[Pre-requisites](#)

[Course Description](#)

[Honors or Standard Course Options](#)

[Standardized Test Prep](#)

[Course Components](#)

- [How do I know if my child is taking good notes?](#)

[How to Use Shormann Math in a CO-OP](#)

[How to Use Shormann Math in a School](#)

[What if my child doesn't do well with timed tests?](#)

[How do I know my child isn't just guessing on their Quizzes and Practice Sets?](#)

[Quarterly Exams](#)

[Grade Book & Grading](#)

[Results of Former Students](#)

Shormann Math combines tried and true teaching methods with 21st Century technology. It is a user-friendly course with video lectures, interactive homework, automated grading, grade recording, video solutions, and Q&A email support.

After completing Shormann Calculus II, students are ready for the AP Calculus BC Exam. A passing score on this exam can earn up to 8 college credits. We strongly recommend you spend 1-2 weeks using any number of AP prep courses available. Most importantly, do 2 or 3 practice exams.

My primary goal is to teach students how math connects to their world and their Creator. I do this by teaching math as the language of science and a tool for understanding God and the world He created. In so doing, I pray that our courses will strengthen the student's relationship with Christ in ways that will help them be productive members of society who seek to glorify God in all they do!

Credits

1 Calculus 2 Credit

Also, see CLEP & AP credits listed below

Pre-Requisites

Any of the below:

- Shormann Calculus 1
- Saxon Calculus through Lesson 105
- Any Other Calculus 1 course

Course Description

Shormann Calculus 2 covers all content found on the AP Calculus BC Exam. A continuation of Shormann Calculus 1, there are 50 lessons divided into 3 quarters. Calculus 2 also includes AP practice using past AP exams. Video solutions are provided for the “free response” (handwritten) portion of past AP Calculus BC exams, which is the most challenging part of the exam. The video solutions also cross-reference back to specific Shormann Calculus 1 and 2 lessons for deeper review (Calculus 2 students have access to all Calculus 1 textbook pages and video lectures). Shormann Calculus 2 continues our unique approach of connecting students to their world and their Creator through solving real-world problems, discussing math history, and discussing the biblical attributes of God found in mathematics. As in all Shormann Math courses, our main goal is for students to strengthen their faith in Jesus and His word, developing a Christ-like humility and joy in their learning, using their education as a way to serve. Topics covered in Shormann Calculus 2 include: advanced integration techniques including partial fractions, Euler’s method, differential equations, arc length, parametric equations, vector valued functions, vector dot and cross products, vector coordinate systems, polar equations, infinite series and error bounds, and representing functions as power series, including Maclaurin and Taylor polynomials and infinite series. When finished, students have a better understanding of God’s Word and His works (Matthew 22:29). Also, they are well prepared for college-level differential equations or vector calculus.

Shormann Calculus 2 provides specific preparation for the CLEP Calculus and AP Calculus AB exam. See [Standardized Test Prep](#) below.

Honors or Standard Course Options

Students who complete the course in a typical school year or less, and use the Honors Grading Scale, can list it as an honors course on their transcript. It is also easily modified for use as a standard course by using the Standard Grading scale.

Honors Grade Scale

A – 93-100
B – 84 – 92
C – 74 – 83
D – 65 – 73
F – 64 or below
I – Incomplete

Standard Grade Scale

A – 90 -100
B – 80 – 89
C – 70 – 79
D – 60 – 69
F – 59 or below
I – Incomplete

Using Shormann Math in a Classroom or Co-op

The beta-test of Shormann Algebra 1 was performed with students in a weekly live online classroom. While we haven't used it yet in a daily classroom setting, we do know it works well in a homeschool co-op style class that meets weekly. Students complete their daily lessons at home, and come to class to ask questions, review the lessons covered that week, and turn in handwritten work + lecture notes. They can then take the online quiz, or take a different one administered by the teacher. At the end of each quarter, they can take the online quarterly exam, or take a different one administered by the teacher. For more information on starting a co-op class in your area, contact Dr. Shormann at drshormann@gmail.com.

Standardized Test Prep for PSAT, SAT, ACT, CLEP, and AP

The main purpose of *Shormann Math* is to help students use math to become more creative like their Creator, glorifying Him and serving others. However, it also provides excellent preparation for standardized tests. Although all the topics required to excel on college entrance exams are taught in Shormann Algebra 2, Shormann Calculus 2 provides ample review of these concepts to ensure students maintain the fluency required to excel on these exams. [PSAT, SAT, and ACT Test Prep Recommendations](#).

AP Calculus BC

This course also teaches all the concepts required to excel on the AP Calculus BC exam. A passing score on an AP Calculus exam is the number one indicator of college success and can boost admissions and scholarship applications in the selection process.

To prepare for the AP Calculus BC exam, complete the following:

1. Shormann Calculus 2.
2. CLEP Professor for CLEP & AP Calculus
3. Prep Lessons on the Shormann Calculus 2 Course Home page.
4. Take 6+ practice tests using a prep book like Princeton Review AP Calculus BC Prep

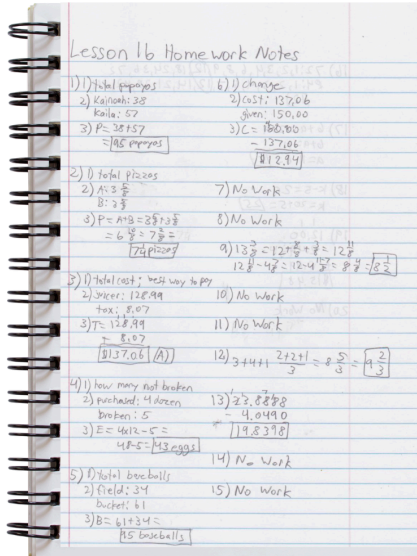
Parent Responsibilities

While the eLearning course provides all the instruction and grading, it is the parent's responsibility to check their student's work to ensure the student is using the course as directed and to supervise students during the 3 exams. Please follow these steps after each lesson is completed:

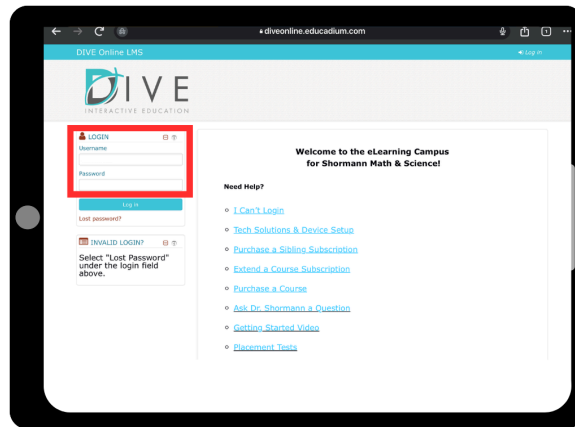
How to Check Student Work

I. Check the Lecture Notes

- 1 After each lesson is completed, have the student bring their notebook to you, which should have their notes and corrections.



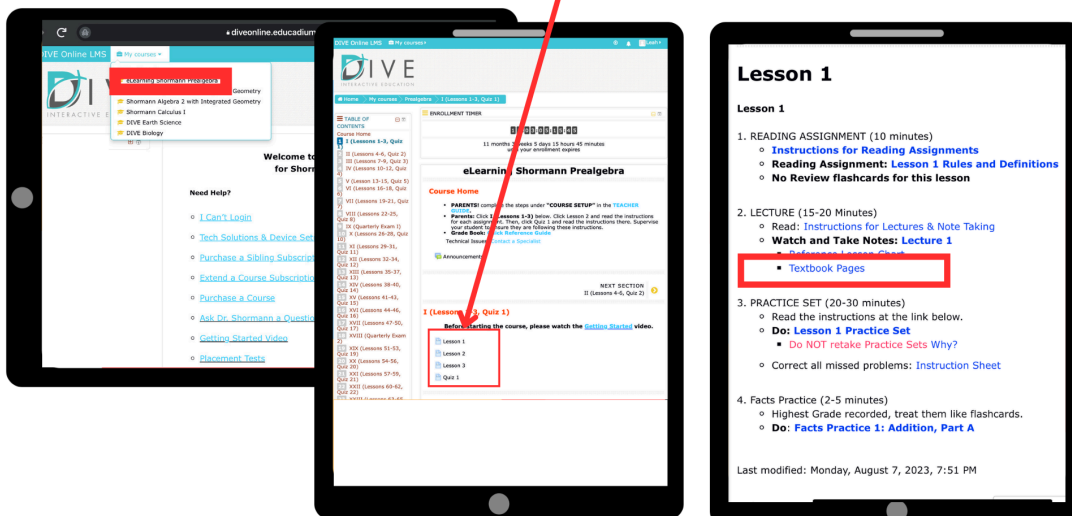
- 2 Go to diveonline.educadum.com. Login using the same login the student uses.



- 3 Place your cursor over "My Courses" then, select "Pre-Algebra".

- 4 In the right menu, select the Lesson #.

- 5 This opens the Assignment Page. Select "Textbook Pages".

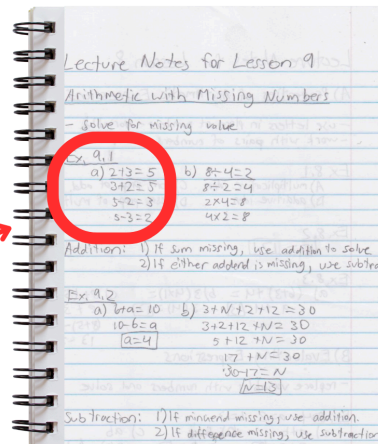
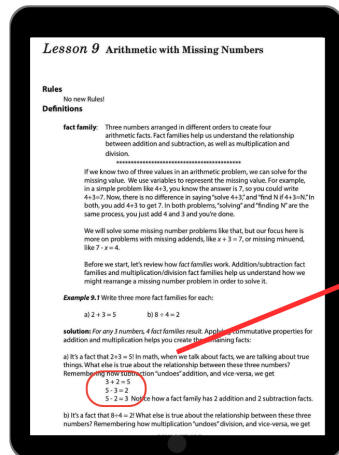




After each example problem is taught, students should **pause** the lecture & **solve** the example problem on their notes.

6

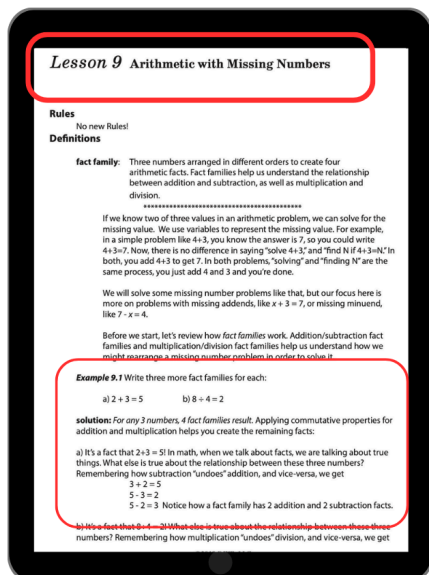
Briefly compare the example problems in the textbook pages to the example problem in the student's notes.



They should also take brief notes with the lesson title, headings, key points, and formulas.



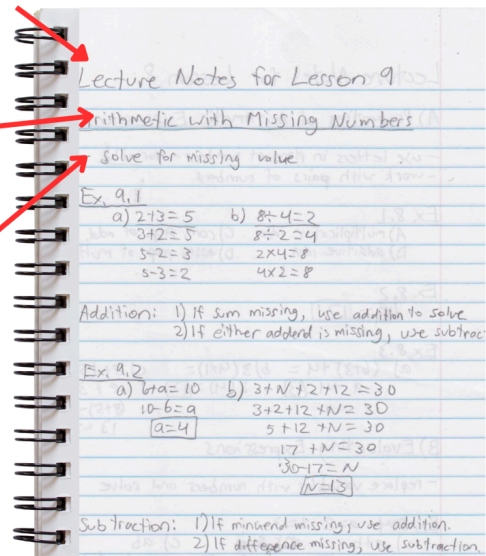
LESSON
TITLE



HEADINGS

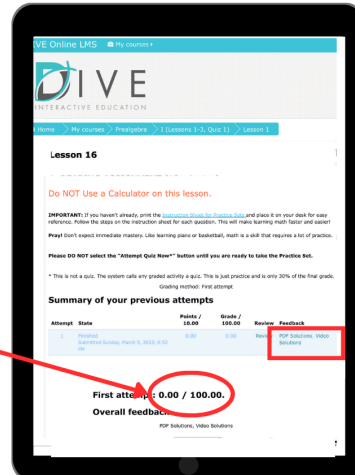


KEY
POINTS



II. Check the Practice Set

- Go back to the Assignment page then, select the link to the Practice Set.
- Select the link to the "PDF Solutions". If you don't see it, read the note below.



Disregard the grade here. It will be explained in the next step.

Summary of your previous attempts

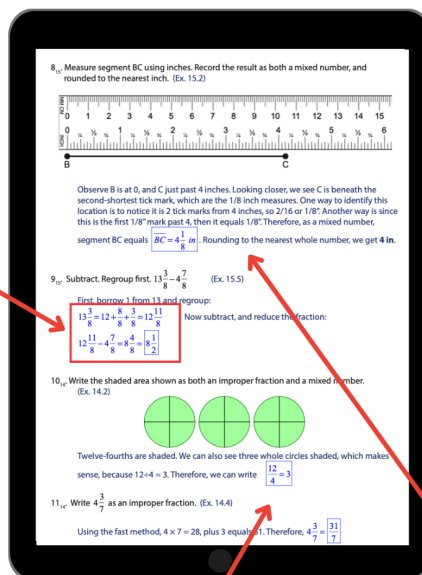
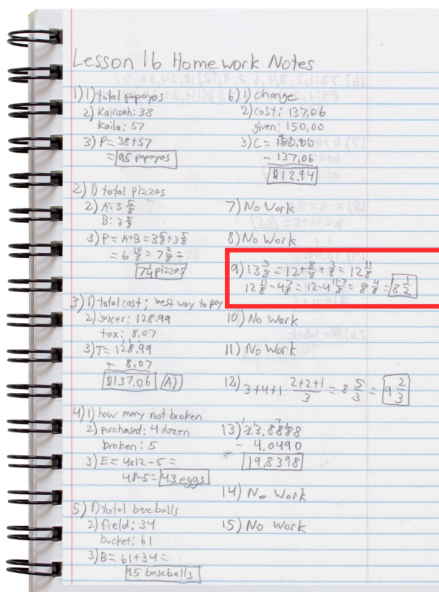
Attempt	State	Points / 20.00	Grade / 100.00
1	In progress		
Continue the last attempt			

If you see this instead of the PDF solutions link, stop here and refer to #1 in the "Solutions" section.



Before entering or selecting an answer, students should solve each math problem on their Practice Set Notes.

- Briefly compare the PDF Solutions to the student's notes.



If the student does not show work, they may be guessing. Make notes on their paper, finish the remaining steps, then discuss it with the student. Also, see #3 in the "Issues" section.

Questions like #10, are simple calculations that don't require showing work.

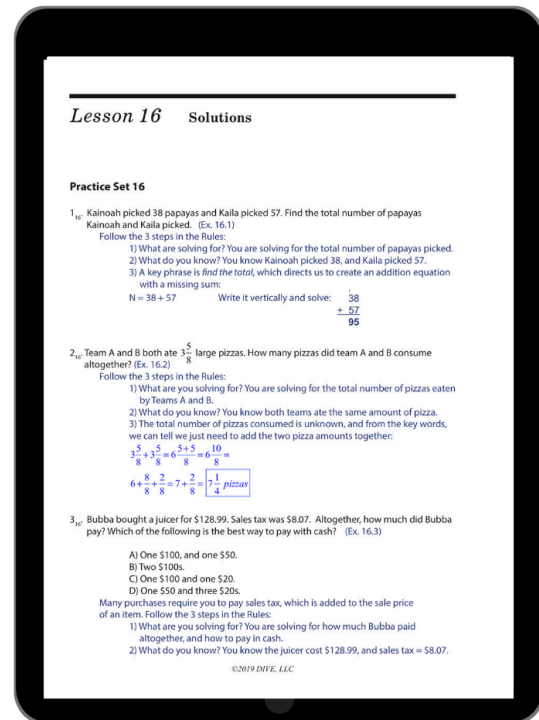
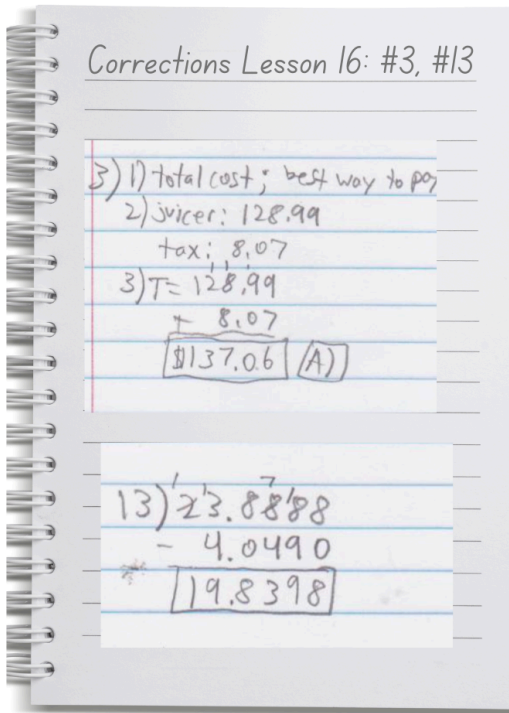
Some questions, like #8, don't require a calculation.

III. Check the Corrections

After completing the Practice Set, students should **watch the video solutions for each question marked wrong then, solve it correctly on their notes.**

- 1 Compare the corrections on the student's notes to the Solutions PDF

- 2 Did the student solve each incorrect problem on their "Corrections" page?



ISSUES WITH STUDENT WORK

Issue #1: Continue Last Attempt

Summary of your previous attempts

Attempt	State	Points / 20.00	Grade / 100.00
1	In progress		

Continue the last attempt

Do you see this instead of a link to the PDF solutions?

This means the student either did not finish the assignment or they forgot to select the "Submit All & Finish" button.

If the student DID answer all the questions he could, simply click the "Continue Last Attempt" button to submit the assignment. Then, have the student follow the steps on page 2 of the "Instruction Sheet for Practice Sets" to watch the video solutions for missed problems and correct them on paper.

If the student DID NOT answer all the questions he could, he should finish the assignment by following the steps on the "Instruction Sheet for Practice Sets" to answer all the questions he can and submit it. Then, follow the steps on page 2 of the "Instruction Sheet for Practice Sets" to watch the video solutions for missed problems and correct them on paper.

Issue #2: More than one attempt is listed.

The eLearning course allows students to re-take practice sets to study for exams. But, only the first attempt is recorded in the online grade book.

Because the student sees all the answers after the first attempt, we recommend you use only the first attempt when checking the student's work.

IMPORTANT: If you haven't already, print (or open in a new window) and follow the steps on this sheet: [Instruction Sheet for Practice Sets](#)

The Instruction Sheet has important instructions on how to use help links, access the video solutions, ask Dr. Shormann a question, and more!

Low or Failing Grade: Do NOT retake Practice Sets. Instead, watch the video solutions and correct as instructed in #6 on the Instruction Sheet.

When you are ready to start, select "Attempt Quiz Now".
Note: This is not a quiz. The system calls all graded activities a quiz.
Grading method: First attempt

Summary of your previous attempts

Attempt	State	Points / 11.00	Grade / 100.00	Review
1	Finished Submitted Saturday, October 10, 2020, 9:13 AM	0.00	0.00	Review
2	Finished Submitted Friday, October 16, 2020, 5:33 PM	5.00	45.45	Review

First attempt: 65.00 / 100.00.
Your final grade from this activity was manually adjusted.

Continue the last attempt

Important: Please Read This Page

Scheduling

Shormann Calculus 2 is divided into 3 “quarters”, leaving the last quarter for students to prepare for the AP Exam.

Fluency = Accuracy + Speed

Math is a language. It is the language of science, a tool used to discover, analyze, and understand God and the world He created. Like reading or speaking a language, fluency is required to use math to communicate and learn. While the main focus of most math curricula is simply accuracy, fluency goes a step further, continuing to practice the skill for a long period of time, developing fluency. Like reading, math fluency is required to fully understand and apply it to new situations like science or questions on a standardized test.

The Timed Method: The key to developing mastery and fluency.

The [timed method](#) is part of an efficient system Dr. Shormann created while teaching Saxon Math to hundreds of thousands of homeschool students over the past 20 years. This system is designed to ensure all students succeed in math by allowing them to learn at their own pace. It is widely accepted that students who learn at their own pace achieve higher levels of learning, building mastery and fluency without frustrating or overwhelming them. While strong math students will go further, often completing Calculus in 11th grade, average or remedial math students may take longer and only complete Algebra 2 or Precalculus in high school. That's okay! The important thing is that they understand what they have learned. However, we often see reluctant or struggling math students who use the [timed method](#) become very strong math students.

How does the Timed Method work?

Instead of requiring the student to complete one lesson per day, work on math four to five days per week, for a specified amount of time per day (see the Teacher Guide). At the end of this time, regardless of how much is completed, stop and pick-up where you left off the next day.

This method allows time, as needed, to relearn forgotten concepts. Re-learning is an essential step in building mastery, long-term retention, and eventually, fluency. As fluency is developed, learning math will become faster and easier and the student will accomplish more and more during the recommended time. .

On the other hand, if the [timed method](#) is not used, students quickly realize that every time they go back to relearn a forgotten concept, it adds time to their daily math lesson. Then they are more likely to skip this crucial step in the learning process. Also, the brain can only learn a certain amount of new information at a time. Once that limit is exceeded, it is difficult to learn new concepts, causing gaps which makes learning math harder and slower. **I cannot overemphasize the importance of review in the process of developing fluency.** That's why Shormann Math is designed to make reviewing as quick and easy as possible.

If I use the timed method, how will my student finish on time?

The [timed method](#) usually has the opposite effect of what parents expect. Once the student knows that they only have to work on math for the specified amount of time, they are free to focus on learning instead of wondering, "how long is this going to take?". If they are stuck on a problem, they are more likely to relearn by watching the linked video lecture because they know that no matter how many times they do this, it will not make their math lesson longer. It may take a few weeks, but as they start to build mastery and then fluency, learning math will become faster and easier.

Earn 14 College Credits

Shormann Algebra 2, Precalculus, and Calculus provide specific preparation for select CLEP and AP exams. If a passing score is earned on these exams, an additional high school math credit can be listed on the high school transcript.

Don't Expect Immediate Mastery

I strongly discourage incorporating "immediate mastery" methods into Shormann Math (Saxon Math, too!). For example, some parents and teachers will not let the student progress to the next lesson unless they have completely mastered the current lesson. This can cause discouragement and exasperation.

Just like in sports or music, it takes time to learn a skill. Most students need to practice a skill over several days before mastery is achieved. That's why the Practice Sets review previous concepts over a long period of time. So, please use the system like it was designed, and give your student time to patiently practice and build their skills!

Focus on Fluency

Fluency means speed and accuracy. The only way to develop fluency is by practicing the skill correctly over a long period of time. Think of a baseball pitcher or a concert pianist. How many times do they practice the same pitch or piece? How many times do they do it wrong while they are learning? Don't be surprised when your child gets the same problem wrong multiple times while they are learning. The key is to relearn the concept and try again.

Conversely, giving the solution before relearning will erode mastery. So instead of "helping" or letting the student see the answer, encourage students to relearn by using the links above each Practice Set question. There is a link to a similar example problem and a link to the video lecture that teaches that concept. In the beginning this process may be slow and laborious. Be patient, use the [timed method](#), and eventually math will be faster and easier.

Course Components

I. **Lessons:** A daily lesson consists of 3 parts:

- **Reading Assignments (Rules and Definitions):** [Instruction Sheet](#)
- **Video Lecture:** [Instructions for Lectures](#)
- **Practice Set:** [Practice Set Instructions](#)

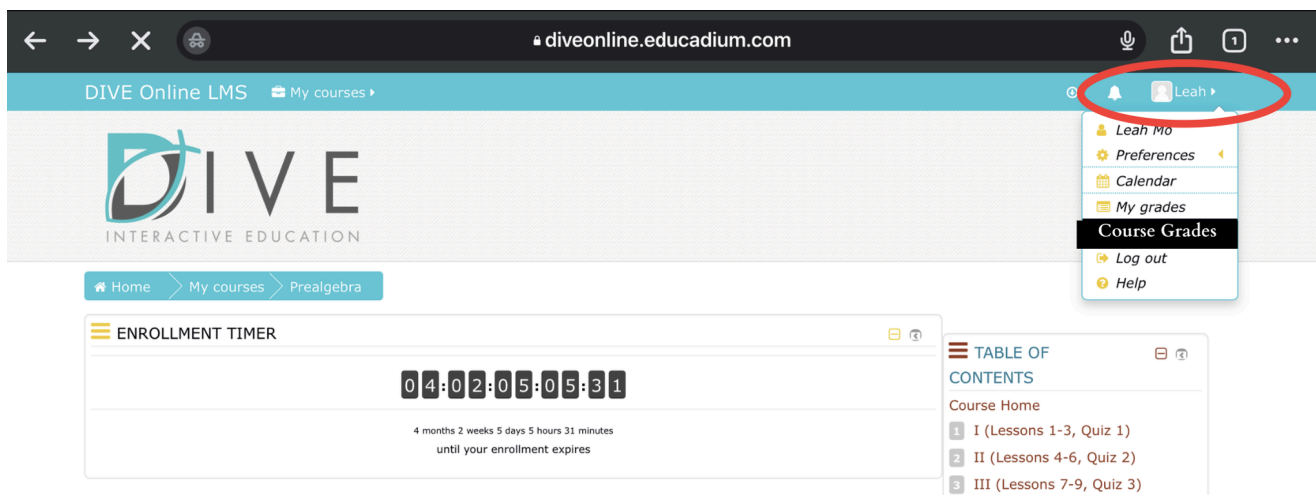
II. **Quizzes:** [Quiz Instruction Sheet](#)

III. **Quarterly Exams:** Quarterly Exams Instruction Sheet (COMING SOON)

Online Grade Book & Grading

Note: If your student has a learning disability or you are not using the course as instructed (skipping assignments, giving more time on exams, etc.), see the Learning Disabilities section below.

1. Login using the same login as the student, select “My Courses” in the top menu, then select the course title. In the top right corner, select the student’s name, then “Course Grades”.



The screenshot shows the DIVE Online LMS interface. The top navigation bar includes 'DIVE Online LMS' and 'My courses'. The user 'Leah' is logged in, and a dropdown menu is open, showing options: 'Leah Mo', 'Preferences', 'Calendar', 'My grades', 'Course Grades' (highlighted), 'Log out', and 'Help'. The main content area features the DIVE logo, a breadcrumb trail 'Home > My courses > Prealgebra', an 'ENROLLMENT TIMER' showing 04:02:05:05:31, and a 'TABLE OF CONTENTS' with links to 'Course Home', 'I (Lessons 1-3, Quiz 1)', 'II (Lessons 4-6, Quiz 2)', and 'III (Lessons 7-9, Quiz 3)'.

2. The grade book will open.

Grade Book: Joe Smith

Assignments	Your Student's Grades		Average Grade of All Students in this Course
	Grade	Percentage	Class Average
Grading Shormann Prealgebra			
Lesson 1 Practice Set	90.00	90.00 %	86.95
Lesson 2 Practice Set	85.00	85.00 %	84.59
Lesson 3 Practice Set	95.00	95.00 %	91.60
Quiz 1(Lessons 1-3)	10.00	100.00 %	9.71
Lesson 4 Practice Set	90.00	90.00 %	93.36
Lesson 5 Practice Set	97.50	97.50 %	94.04
Lesson 6 Practice Set	92.50	92.50 %	91.64
Quiz 2(Lessons 4-6)			

Grade: This is your student's grade in points.

Percentage: This is your student's grade as a percentage.

Class Average: This is **NOT** your student's grade. It's the average grade of ALL the students who have taken this assignment.

Running Average:

Scroll down to the bottom of the grade book and find the Running Average. This is the grade for all the assignments that have been completed so far. It does not include the zero for assignments that have not been completed. So, as long as the student has not skipped any assignments, this is where you would see the student's current grade based on the assignments they have completed.

Assignments	Grade	Percentage	Class Average
Practice Exam 4.1	-	-	93.14
Practice Exam 4.2	-	-	94.20
Quarterly Exam 4	-	-	87.22
Shormann Algebra 1 Running Average	1957.57	86.62 %	4596.11
Final Grade Simple weighted mean of grades. Include empty grades.	11.29	11.29 %	37.21

Running Average - Only Completed Assignments

Final Grade

Final Grade:

This is the grade used at the end of the course for the final grade. It includes the zeros for assignments that were not completed. In this example, only a few of the assignments have been completed so the final grade is very low. At the end of the course, if all assignments are completed, the Final Grade and Running Average are the same. If they are not, see the solutions below.

Add Extra Credit to the Final Grade

For details, see "[Optional Extra Credit](#)" below.

Transcripts & Credits

For a free transcript template and detailed instructions, see [Transcripts & Credits](#)

ISSUES WITH THE GRADE BOOK

Issue 1: Final Grade and Running Average Are Not the Same

This means one or more assignments were not completed. Scroll through the grade book and look for assignments in the "Percentage" column that don't have a grade. See the next section to resolve this issue.

Issue 2: No Grade in the Percentage Column

1. Select the title of the assignment in the Grade Book.
2. If there is a button that says "Continue Last Attempt", this means the student opened and/or started the assignment but did click Submit All & Finish. Select the "Continue Last Attempt" button, "Finish Attempt" then, "Submit All & Finish".
3. If there is an "attempt quiz now" button, this means the student did not start the assignment. You can either leave it as a 0 or have the student do the assignment, which will raise the final grade.

Grade Weights

The following describes how the grades are "weighted".

Practice Sets & Practice Exams: 30%

Weekly Quizzes: 30%

Quarterly Exams: 40%

Optional: Add Extra Credit

Keep in mind, as the parent and/or teacher, you are responsible for assigning grades. Our grading system is a tool to help you. You are not required to use the grades in the eLearning grade book or follow any of our recommendations. Use the course like you would any other curriculum, like Abeka or Bob Jones.

If your student corrected missed problems for all assignments, extra credit can be added at the end of the course by following the option below. However, this is optional because the eLearning system already includes some extra credit by allowing students to take the exams twice and averaging the scores which is like adding up to 10 points to each exam grade.

Option 1: Add up to 3 points to the Final Grade in the Grade Book. (The final grade should not be more than 100.)

Option 2: Use the “Simplified Grading Method” below.

This extra credit cannot be added to the grade book. Simply add the points to your student’s final grade, then put the new grade on the Certificate of Completion (see below).

Certificate of Completion

Upon course completion, a certificate of achievement can be printed. Go to the Course Home page, scroll down the left menu, then click **Certificate**. There are detailed instructions on how to save, edit, and print the certificate.

Learning Disabilities: How to Modify the Timed Quizzes and Exams

While we cannot change the timer on the exams or quizzes, you can give the student more time by following these steps. However, you will need to manually record grades or use the “Simplified Grading Method” (see above) instead of using the online grade book.

Quizzes: How to Modify the Time

Parent Supervision Required: After the first attempt, the Results Page with all the answers is displayed. Quizzes have a 20 minute time limit and four questions. To double the time to 40 minutes, follow these steps:

1. The student should study using the Study Instructions just above the link to the quiz.
2. Have the student take the quiz twice. In the first attempt, complete only the first two questions. In the second attempt, complete the last two questions.
3. Add the two scores together.
4. Have the student correct missed problems by following the Quiz Instructions linked above the quiz.

5. Use the [“Simplified Grading Method”](#) below.

Exams: How to Modify the Time

Parent Supervision Required: The exams are limited to one hour. This method doubles the time to two hours.

1. Study using the Study Instructions linked just above the exam.
2. Have the student take the exam twice. In the first attempt, complete only the first half of the exam. In the second attempt, complete the second half. This gives the student 2 hours to complete the exam.
3. Add the two scores together.
4. Have the student correct all missed problems on paper. If they correct all missed problems, **add 100 points to their grade**. Then, divide it by two. This is the equivalent of giving them two full attempts and averaging the scores.
5. For grade recording and calculating a final grade, see the next section below.

Grading for Learning Challenged Students

Because students with learning challenges often require many accommodations, instead of using the grades in the eLearning course and submitting multiple grade change requests, manually record the four exams, then use the Simplified Grading Method to calculate the final grade.

Simplified Grading Method

If you allow your student to skip assignments, modify the time for learning disabilities, etc, the online grade book will not accurately calculate a final grade. Instead, use this simple method to give a completion grade of 90 for all Facts Practice, Quizzes, Practice Sets. This way, you don't need to submit multiple grade change requests or manually record all the scores. All you need is the average of the four exam grades to put in the formula below. This new grade can be added to the Certificate.

Exam Average: Add the exam grades and divide by 4.

Final Grade = Exam Average (.40) + 54

For Example: If the exam average is a 70, it would be: $70 (.40) + 54 = 82$

To use a different completion grade for the Practice Sets and Quizzes, use this formula:

Final Grade = Exam Average (.40) + Completion Grade (.60)

To calculate an exact score manually, record all the grades, then use this formula:

Exam Avg. (.40) + Quiz Avg. (.30) + Practice Set Avg. (.30)

You can also request a grade change for each assignment by using the “Request A Grade Change Form” on the Course Home page.

Results of Former Students

Why do results matter?

Shormann Math builds on a solid foundation of time-tested teaching methods, including the incremental development + continual review format pioneered by John Saxon(1923-1996). And not just Saxon’s teaching methods, but his teaching thoughts as well, including his thought that “Results, not methodology, should be the basis of curriculum decisions.”

One of the primary reasons John Saxon developed his math curriculum in the 1980s was because new ways of teaching math were not working. Math “educrats” at the time were promoting their untested “visions” of math teaching. But with 3 engineering degrees, John was a math user before he became a math teacher. Not only that, he was a test pilot. If anyone knew the extreme value and importance of testing a new product, it was John!

Results matter because they reveal whether or not a new product really works. And while statistics certainly don’t reveal everything about a new product, they can certainly reveal many things. **Most publishers don’t provide any details of student performance.** Shormann Math is different, and we are thrilled we can provide the public with the following statistics to help you make informed decisions.

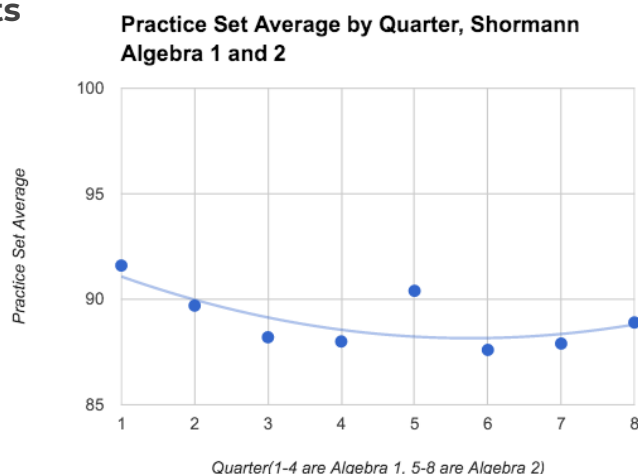
Overall performance(Algebra 1)

Overall Average	90.3%
Range(lowest to highest)	81.0-97.9%
% Students making an A(90%+)	67%

Discussion: The average student in our beta test made an A in the class! Because each new Shormann Math course is beta-tested in a live online class setting, Dr. Shormann gets to know the students on more than just a “numbers only” basis. And we all know that God doesn’t make clones, so the fact that not every student

performed the same should not be a surprise. Natural talent definitely matters, but so do things like attitude and maturity. Dr. Shormann spends time during the video lectures encouraging students to develop fruits like patience and self-control (Galatians 5:22-23), as well as persevering with joy (James 1:2-3), and gratefulness (1 Thessalonians 5:18).

Practice Sets



Discussion: You've probably never seen statistics on student performance in a math class before, which is why it is important to discuss the data! We had hoped the average student would achieve a Practice Set average above 85%, and that was achieved in all 8 quarters! 85% is a good cutoff for determining whether students are understanding, and retaining most of the concepts learned.

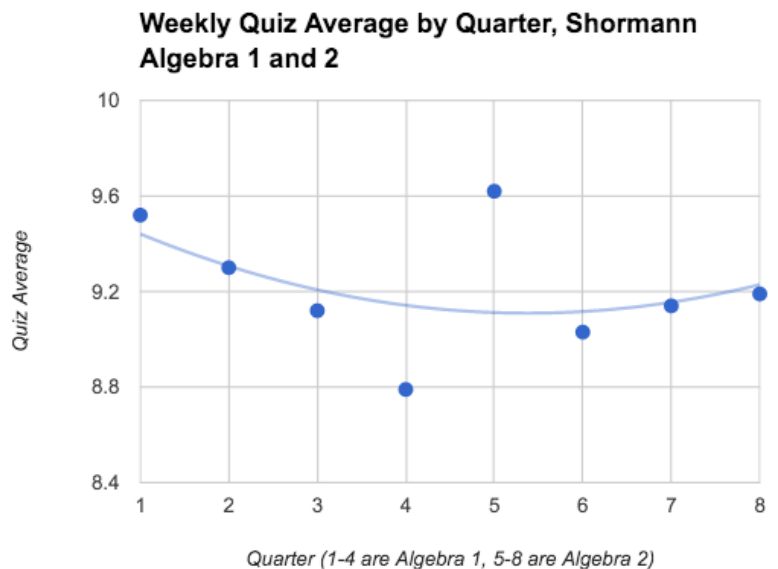
Note also the high first quarter average in both Algebra 1 (Quarter 1) and Algebra 2(Quarter 5). Because Shormann Math is built on John Saxon's method of integrating geometry and algebra, students using Saxon Math 8/7, Saxon Algebra $\frac{1}{2}$, or Shormann Prealgebra will be most comfortable starting Shormann Algebra 1. Now we recommend Shormann Prealgebra instead of Saxon 87 or Saxon Algebra $\frac{1}{2}$. However, not all beta-test students used Saxon previously, and not all Shormann Algebra 2 students used Shormann Algebra 1(most used Saxon). Therefore, the high first quarter averages are a good indication that students who successfully completed any pre-algebra course should do just fine in Shormann Math, and non-Shormann Math Algebra 1 students can succeed in Shormann Algebra 2.

Finally, in the trendline shown, notice the dip in the middle of both courses. This seems like a natural pattern if you consider the facts that, during this time,

1. Young students are being exposed to new and increasingly complex concepts.
2. As time progresses, students mature and begin to learn what it takes to study, and retain, increasingly complex concepts.
3. Becoming proficient at a subject takes time, so don't quit too soon if it seems challenging! Completing Shormann Algebra 1 and 2 also includes a geometry

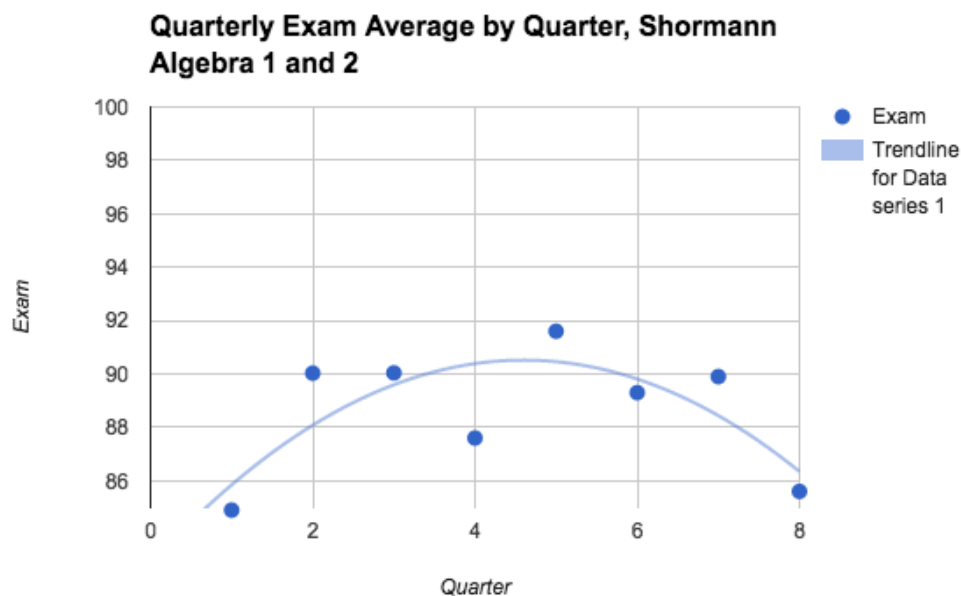
credit, so if you are doing the self-paced option, it's perfectly fine to spread this out over 12 quarters (3 years) instead of 2.

Weekly Quizzes



Discussion: Weekly Quizzes show a similar trend to the Practice Sets, which affirms what we discussed in 1-3 above. A score of 8 out of 10 or higher is a good indication of whether students understood the lessons covered that week. We are pleased that scores were well above this in all eight quarters!

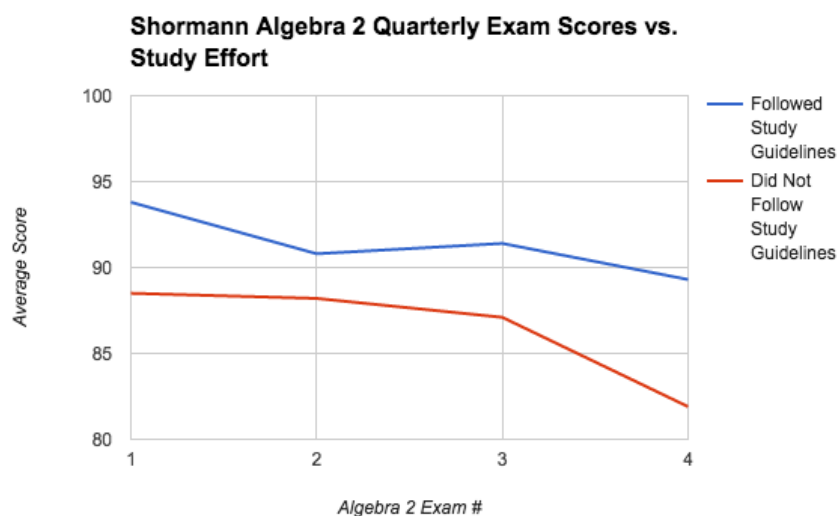
Quarterly Exams



Discussion: The trend for quarterly exams is not the same for Practice Sets and Weekly Quizzes, as the trend is for maximum scores in the 5th Quarter, which is the introductory quarter of Algebra 2. One of the big reasons for this trend has to do with not giving the students enough practice prior to Quarterly Exam 1 in Algebra 1. This is one reason we beta-tested the course prior to releasing it to the general public, so we could make any adjustments we believed were necessary. After Exam 1, we started providing students with two practice exams, and afterwards, all quarterly exam averages improved.

Another big reason for the trend is that not all students took advantage of the practice exams, and/or did not follow instructions for studying. On the week of a quarterly exam, students are given study tips. **The main thing students need to do is practice, as there is simply no substitute to success in mathematics, or pretty much anything else you want to be good at, than to practice. A lot.**

Two key steps in properly studying include 1) retake all Weekly Quizzes and 2) complete both Practice Exams. Because our eLearning campus provides detailed information on each student's Quiz and Practice Exam attempts, I was able to determine which students studied properly (completed both 1) and 2) above) from those who did not (completed either 1) or 2) or neither). Results are shown below for the beta-test students in Shormann Algebra 2.



The conclusion from the above graph is obvious: students who study harder do better in Shormann Math! Students who followed the study guidelines averaged at

or well above 90% (A), while students who did not follow the guidelines averaged below 90% (B). The results also show that Shormann Math is providing the tools students need to become fluent in mathematics.

Finally, 85%+ is an indicator of good retention and understanding of concepts covered in a quarter. For all 8 quarters, student averages shown in the Quarterly Exam Average by Quarter chart were at, or well above 85%. Because of Shormann Math's format of continual review, we are basically asking students to be responsible for "all their math, all the time." These results show that on average, students in the beta courses responded very well!

Keep in mind, too, that these students did the "high performance level" version of Shormann Math, where the course is completed in 30 weeks (37 weeks if you count the breaks), and they did not have as much time to complete the quizzes or quarterly exams. In the standard course, students have 5 extra minutes per quiz, and 15 minutes extra on quarterly exams. You also receive a 2-year subscription per course, almost 3 times more time than beta-test students were allowed.

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