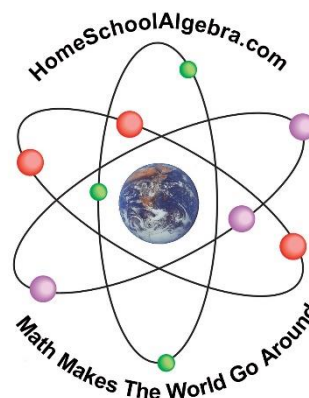


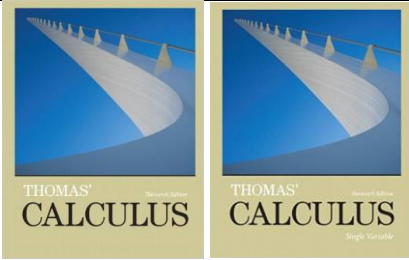
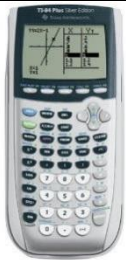
# Calculus I

## Syllabus



<b>Instructor</b>	Clark Brown	<b>Phone</b>	702-714-0133
<b>E-mail</b>	<a href="mailto:clark@homeschoolalgebra.com">clark@homeschoolalgebra.com</a> . This is the best way to contact me; I check it throughout the day. You can also message me from the Schoology Learning Management System or text me at the phone number above.		
<b>Online Face to Face Help</b>	I am typically available throughout the week to meet with you via video-conference and answer any math questions you may have or assist you with other issues you may be having with the course. Simply email, message me through the Schoology LMS, or text me and I can often meet with you within the hour in the "Zoom Room" at the LMS.		
<b>Availability</b>	I check my e-mail throughout the day and make every effort to respond as soon as possible. If you do not receive a reply in a timely manner, and especially by the next business day, please send me another message or call me (I won't be offended!). I'm here to help you, and if you don't hear from me it's possible I either didn't receive your message or it accidentally got overlooked.		

### Course materials and equipment:

<p><b>Textbook:</b>          Thomas' Calculus, by Weir and Hass; Thirteenth Edition, complete or single variable edition (ISBN <a href="#">9780321878960</a> or <a href="#">9780321884046</a>). Be careful <b>not</b> to get the Early Transcendental version. Earlier editions may also work, but check with me first.</p>		<p><b>Calculator:</b>          The TI-83 or 84 Plus Graphing Calculator is <b>required</b> for this course. <b>DO NOT</b> get a TI-85,86, 89, Inspire, or Casio. The color version is fine, but not necessary.</p>	
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### Course Description:

- This course introduces students to the main ideas of calculus, including limits, the derivative, and the integral. Topics include the basic rules for differentiation and integration of algebraic, trigonometric, exponential, logarithmic, and general functions, as well as applications of calculus to geometry, science, and engineering.

**Prerequisite:** Students must have a sound understanding of the PreCalculus concepts of College Algebra and Trigonometry to be successful in Calculus. Students who are unsure of their skill level should contact the instructor to assess what level they will be most successful at.

### Course Goals

- Evaluate limits using numeric, graphic, and algebraic techniques.
- Find derivatives of functions using techniques of differentiation.
- Integrate functions using techniques of integration and the Fundamental Theorem of Calculus.
- Solve applied problems using the derivative and the integral.

### Resources for Help:

- **Your Instructor:** Many students find college level mathematics to be some of their more challenging courses and make the mistake of waiting too long to get help. As your instructor, I am your first and best resource for help! If you find yourself struggling please don't hesitate to contact me!
- **Learning Management System (LMS):** This course uses the Schoology LMS to organize and manage its resources and to facilitate the submission of course assignments. Instructions will be provided for access upon enrollment.
- **Lecture Videos and Handouts:** Lecture videos will cover nearly every topic and problem type of the course. These videos are included in each lesson folder at the Learning Management System (LMS). Lecture handouts specific to each video are also provided to assist students in taking good notes to facilitate their learning.
- **The Khan Academy** at <http://www.khanacademy.org/>, **HippoCampus** at <http://www.hippocampus.org/Algebra>, and **Mathispower4u** at <http://mathispower4u.yolasite.com/> offer a multitude of short video lectures on nearly every algebra concept. When you are stuck and don't know what else to do, try searching here or on YouTube for immediate help!

### Grading Policy:

- **Examinations:** Three regular exams will account for 50% of your grade. A comprehensive final exam will be given at the end of the course and account for an additional 20% of your grade. Exam problems are similar to those assigned as homework and as found in the selected problems. The best way to prepare for your exams is to regularly review your lecture notes, homework problems, and selected problems. Exams are closed note and closed book, except for one 3 x 5 card with notes of your choice that is allowed on each of the exams. Parents will proctor their student's exams and upload them to the appropriate dropbox in the LMS using the procedure described below.

Regular Exams	50%
Comprehensive Final Exam	20%
Lecture Notes	10%
Homework	10%
Selected Problems	10%
<b>Total</b>	<b>100%</b>

- **Lecture Notes:** 10% of your grade will be awarded simply for watching the lecture videos, taking notes using the fillable lecture notes, and submitting a scanned image of them along with your other assignments to the appropriate dropbox in the Learning Management System. In order to receive credit your lecture notes must be both **neat** and **complete**. At the top of each **set** of lecture notes submitted ((i.e., just one statement for the entire set of notes submitted for each lesson folder), **the student is required to include the following statement: "I have conscientiously viewed / completed \_\_\_\_\_% of the lecture videos / notes for Lesson Folder \_\_\_\_\_"**, filling in the blanks appropriately. At the end of the syllabus is a page of these statements that can be clipped and attached instead of handwriting it. See below for instructions about how to submit assignments.

- **Homework:** 10% of your grade will be determined by homework that will be submitted for each lesson folder and checked for general completeness and competency. **Please note carefully that individual problems will not be graded.** It is the student's responsibility to check his/her answers with the back of the book and contact the instructor with questions as needed. However, your understanding of the homework will be tested on the Selected Problems assignments by giving problems that are very similar to those assigned as homework. **At the top of each set of homework sections you submit for each Lesson Folder you are required to include the following statement: "I have shown all work and conscientiously completed \_\_\_\_\_% of the HW for Lesson Folder \_\_\_\_\_"**, filling in the appropriate percentage and sections. (At the end of the syllabus is a page of these statements that can be clipped and attached instead of handwriting it.) Your homework score will be based upon your self-assessment which I will validate.

One must learn by doing the thing;  
for though you think you know it you  
have no certainty, until you try.  
Sophocles, c.450 BC

- **Selected Problems:** The remaining 10% of your grade will be determined by selected problems that you will work out on paper / pencil and then scan and upload to a dropbox located in the appropriate Lesson Folder in the LMS. These problems will be specifically chosen to give you an idea of the most important concepts in each section, and that will help prepare you for the exams.
- **Be Neat and Organized and Communicate Effectively:** All written work should be done neatly and in a clear and organized manner. These skills are especially important in mathematics where many mistakes can be avoided simply by taking the time to be neat and organized. All Homework, Selected Problems, and Exams should be done in pencil with a good quality eraser at hand to correct mistakes. Graph paper should be used for all graphing (download for free at LMS), and a 6 inch ruler should be used for drawing straight lines. The student's goal in all written work should be to make it as easy as possible for your instructor to review, and in it to clearly communicate to your instructor your understanding of the material. Wherever applicable the student should use proper English grammar and sentence structure.
 

Success takes time and willingness to objectively and honestly analyze your mistakes. That's the key to getting smarter at anything in life.  
*William J. O'Neil*
- **Electronic Submission of Assignments:** To facilitate grading of your assignments, **your work must be scanned to a single PDF file.** This can be easily done several ways, including the following:
  1. **CamScanner** is an app available for both Android and iPhones that will allow you to use the camera on a smart phone to scan your work to a pdf.
  2. Alternatively, a computer scanner can be used to accomplish the same thing. These scanners typically comes with software that will scan to a PDF file, or **cutepdf** and **scan2pdf** are free programs that can be downloaded for use with a personal scanner.
  3. A third option would be to take a good quality picture of your work and insert it into a Word document, then use the "SAVE AS..." feature to save the Word document as a PDF file.

In preparing your written work, keep in mind that you will be scanning and uploading it, so leave a half inch margin and be sure any information you wish to include is within the scanable region.
- **Course Flexibility and Due Dates:** The course has been designed to provide students and their families the flexibility that homeschooling allows. However, learning mathematics requires more effort than many other endeavors, and there is a direct correlation between a student's success in mathematics and the student's regular participation and faithful completion of requirements. In general, each Lesson Folder corresponds to approximately one week's work to complete the course in a semester, and two week's work to complete it in an academic year. It is essential that students and their families determine a deadline for the final completion of the course and establish due dates for each lesson folder according to what works best for them. Students must then pace themselves to work methodically through the course materials and adhere to their deadlines in order to complete the course in a timely manner.
- **A Word About Cheating Yourself In This Math Course:** Keep in mind that the goal of this course is not to just jump through an educational hoop that costs you time, money and frustration but doesn't actually benefit you. Rather, it is to prepare you for success in later math and science courses where the skills you learn here are absolutely essential. Math is very cumulative and sequential, and my experience teaching math for over 30 years is that those who do not earnestly seek to understand the concepts by doing their own work only cheat themselves, and usually don't figure that out until much later when it is too late and too difficult to remedy. If you do your work honestly your grade will be an honest reflection of what you know going forward, and will also help guide you as make life decisions based on your unique gifts.

- **Grading Scale:**

A	90-100%	D	60-69%
B	80-89%	F	below 60%
C	70-79%		

**Time and Effort Expectations**

- Learning mathematics is no different than most anything else of significant lasting value—there is a cost involved to obtain it. Many students fall behind in their math courses simply because they don't expend the time and effort necessary for success. Depending upon the student skill and preparation, to complete this course in a semester will on average require 10-16 hours per week, and approximately half that each week for completion over an academic year. To be most effective, time should be allocated each day, preferably at the same time, and spent on task watching the lecture videos, taking notes, reading the textbook, doing the homework, reviewing previous material, and preparing for the exams. By keeping up with your work you will find that your daily efforts pay off in a level of understanding that allows you to face exams without worry or cramming. Remember that “yard by yard, math is hard, but inch by inch, math is a cinch”!

**Organize Your Life:**

- A large part of success not only in this math course but in any formal educational endeavor has to do with students' ability to effectively manage all aspects of their lives (family, work, recreation, finances, health, time, relationships, etc...) in such a way as to have in place the stable “infrastructure” upon which to build their education. Learning anything new, and especially mathematics, is hard work, perhaps harder than any job you will ever have. Students who are unsuccessful most often find it is not because they are incapable of learning the coursework, but because they have not adequately allowed for the extra time and effort from their normal routine that are required for success. It is therefore important that students and their families organize their lives to allow for the time and energy commitment necessary for the successful completion of this class and their educational goals.

**Carpe Diem (Seize the Day):**

- Students should also keep in mind that their formal education happens during a relatively short but important time of their lives. The time you invest now becoming proficient in important skills like mathematics will be rewarded throughout your life. On the other hand, the opportunities you have now for your education will diminish with time, and things that are easier for you to learn now in your youth will become more difficult. So “seize the day” by making the most of the opportunities you have while you have them.

**The only difference between the successful person and everyone else is determination and persistence.**

**William J. O'Neil**

**Work Hard and You Will Succeed!**

# Tentative Course Schedule 13<sup>th</sup> Edition

## (Print this Schedule For Reference Throughout the Course!)

**NOTE:** Each Lesson Folder corresponds to approximately one week's work to complete the course in a semester, and two week's work to complete it in an academic year. **Lesson folder due dates were emailed to students and parents upon enrollment, and those dates should be filled in on this sheet for reference throughout the course.**

"eoo" means "every other odd", i.e., 1,5,9, etc... Keep in mind that the goal of HW is to learn the concepts, not just complete an assignment. Students should do additional problems as needed for topics with which they have greater difficulty.

Lesson Folder	Due Dates	Sec	Topics	Assignment (13 <sup>th</sup> edition)
				Work through the Getting Started folder at the LMS. Use the link on the last page of the syllabus to provide your student information for the course to the instructor.
1		1.1-1.4	Introduction, Precalculus Review	1.1 #1,3,17,25,37,41,49,51; 1.2 #5,11,23,27,39, 55a-f, 69; 1.3 #1,5,7,13,19,41,43,53; 1.4 #25
		2.1	Rates of Change and Tangents to Curves	1-17 eoo, 19, 21
		2.2	Limits of a Function and Limit Laws	1-49 eoo,51,53,57,61,65,67,71
2		2.3	The Precise Definition of a Limit	1-25 odd, 33-41 odd, 57
		2.4	One sided Limits	1-41 eoo
		2.5	Continuity	1-11 odd, 13-29 eoo, 31,35,39,43,47-55 odd
3		2.6	Limits Involving Infinity; Asymptotes of Graphs	1-21 odd, 23-35 eoo, 37-61 odd, 63,67,69,73, 101
		3.1	Tangents and The Derivative at a Point	1-17 eoo, 19,23,25,29,39,41
		3.2	The Derivative as a Function	1,3,7,11,13,17,19,23,27,31,35,37,41,43,45,47,59
4		3.3	Differentiation Rules	1-45 eoo, 43
		3.4	The Derivative as a Rate of Change	1-25 eoo, 15,23
		3.5	Derivatives of Trig Functions	1-17 eoo, 19-47 eoo, 33, 55, 61-65 odd
5		3.6	The Chain Rule	1-73 eoo
			<b>Exam 1 Review Exercises</b>	<b>See LMS</b>
			<b>EXAM 1</b>	
6		3.7	Implicit Differentiation	1-13 eoo, 15-39 eoo, 41
		3.8	Related Rates	1-15 odd, 19,23,25,27,31,33,37,41
		3.9	Linearization and Differentials	1-5 odd,9-37 eoo, 15, 35,41-49 odd
7		4.1	Extreme Values of a Function	1-13 odd, 17-49eoo, 55,59,65,69,73
		4.2	Mean Value Theorem	1-9 odd, 13,15,19,27,29,31,35,37-53 eoo
		4.3	Monotonic Functions, First Derivative Test	1-17 eoo, 15-27 eoo, 33-57 eoo
8		4.4	Concavity and Curve Sketching	1-41 eoo, 49-65 eoo, 71-83 eoo, 93,95
		4.5	Applied Optimization Problems	1-17 eoo, 19,27,33,37,39,45,51
		4.6	Newton's Method	1,3,5,7,11,13,18
9		4.7	Antiderivatives	1-15 odd, 17,23,27,31,33-49 eoo,51-99 eoo, 69
		5.1	Area and Estimating with Finite Sums	1-17 eoo, 19
		5.2	Sigma Notation and Limits of Finite Sums	1-21 odd, 25,29,35,39
10		5.3	The Definite Integral	1-17 odd, 25,27,31,35,39,41,45,49,51,55,59
			<b>Exam 2 Review Exercises</b>	<b>See LMS</b>
			<b>EXAM 2</b>	
11		5.4	Fundamental Theorem of Calculus	1-25 eoo, 29-47 odd, 51,55,57,59,63
		5.5	Indefinite Integrals and the Substitution Method	1-15 odd, 17-49 eoo, 51,55,59,61
		5.6	Substitution, Area Between Curves	1-37 eoo, 43-75 eoo
12		6.1	Volumes Using Cross Sections	15,17,19-31 eoo, 33,35-47 eoo, 57
		6.2	Volumes Using Cylindrical Shells	1-7 odd, 11,15,17,21,25,31,35
		6.3	Arc Length	1-15 odd
13		6.4	Areas of Surfaces of Revolution	1,5,9,15,17,19,27
		6.6	Moments and Centers of Mass	1,3,7,11,13,27
		7.1	Inverse Functions and Their Derivatives	#1-17 eoo, 19-27 eoo, 33,37,41,51
14		7.2	Natural Logarithms	#1-65 eoo; #53 hint: factor $2\sqrt{x}$ from the denom.
		7.3	Exponential Functions	#1-117 eoo, 51
		7.5	Indeterminate Forms and L'Hopital's Rule	#1,5,7-67 eoo,75,83
15		7.6	Inverse Trig Functions	#1-11 odd, 13-85 eoo, 91,103
			<b>Exam 3 Review Exercises</b>	<b>See LMS</b>
			<b>EXAM 3</b>	
16			<b>Final Exam Review Exercises</b>	<b>See LMS</b>
			<b>Final Exam</b>	

**Do not worry about your difficulties in mathematics. I assure you that mine are still greater.**  
*Albert Einstein*



