MAC 2312 Syllabus
SPRING 2018

LECTURE: MWF 3 (NRN137):   Copenhaver

LIT 429; Office hours: TBA;   Email: keithc@ufl.edu

LECTURE: MWF 5 (TURL007):   Pfeffer

LIT 433; Office hours: TBA;   Email: d.pfeffer@ufl.edu

LECTURE: MWF 8 (TURL007):   Chui (coordinator)

LIT 376; Office hours: MWF 5 period;   Email: chui@ufl.edu

(Please specify your lecture period, discussion section & TA's name in the Subject line of <u>any email correspondence</u> with us).

My Lecturer

Name: _____

My Discussion Leader (TA)

Name: _____ Email: _____

Discussion Time & Location: _____

Office & Office Hours: _____

TEXT: This course will be participating in the UF All Access program. The e-textbook, Calculus Early Transcendental by Stewart, is included in the required WebAssign access code. See **Online Homework** for an option with reduced price. Do not purchase the code directly from WebAssign or book stores.

MAC 2312, Spring 2018

Monday	Tuesday	Wednesday	Thursday	Friday
Jan 8 L1	9 First Tuesday Discussion (L1)	10 L2	11 First Thursday Discussion (L1-L2)	12 L3
15 MLK Day No Class	16 Discussion Class	17 L4	18 Discussion Class	19 L5
22 Starts Clicker L6	23 Quiz 1 (L1-L5)	24 L7	25 Quiz 1 (L1-L6)	26 conflict, make up sign up deadline L8
29 L9	30 Discussion Class	31 L11	1 Discussion Class	2 Clicker registration deadline L12
+Feb 5 L13	6 Quiz 2 (L6-L12)	7 L14	8 Quiz 2(L7-L13)	9 L15
12 L10(Review)	13 Discussion Exam 1(L1- 13)	14 L16	15 Discussion Class	16 L17
19 L18	20 Written HW1(L1-16) Quiz 3 (L14-L17)	21 L19	22 Written HW1(L1-16) Quiz 3 (L14-L18)	23 L20
26 L21	27 Quiz 4 (L18-L20)	28 L22	Mar 1 Quiz 4 (L18-L21)	2 L24
Mar 5 – Mar10 **Spring Break**				
12 L23(Review)	13 Discussion Exam 2(L14-23)	14 L25	15 Discussion Class	16 L26
19 L27	20 Written HW2(L17-28) Quiz 5(L24-26)	21 L27-L28	22 Written HW2(L17-28) Quiz 5 (L24-27)	23 L28
26 L29(Review)	27 Discussion Class	28 L30	29 Discussion Class	30 L31
Apr 2 L32	3 Quiz 6 (L27-31)	4 L33	5 Quiz 6 (L28-32)	6 L34
9 L35(Review)	10 Discussion Class	11 Exam Review	12 Discussion Exam 3 (L24-35)	13 L36
16 L36	17 WrittenHW3(L29-35) Discussion Class	18 L37	19 Written HW3(L29-35) Discussion Class	20 L37
23 clicker alert Review	24 Discussion Class	25 verify all grades Review	26 No Class Reading Day	27 No Class Reading Day

*Evening Exam Time: 8:20 – 9:20PM. See Canvas for Exam locations.

- Cumulative Final Exam: Saturday, April 28, 12:30 PM – 2:30 PM.

- Clicker registration deadline – receive weekly report and verify & resolve weekly grade issues.

- clicker alert-Forfeit all clicker points if still have not resolved all clicker grade issues by 4/23.

- Verify and resolve all Canvas grades issues: 4/19-25. **Absolutely NO grades disputes after 4/26.**

MAC 2312, WA Due Dates Sping 2018

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
	Jan 8 **L1**	9	10 **L2**	11	12 **L3**
	15 **MLK Day No Class**	16	17 **L4**	18 IBP(CC), Trig Int (CC) & Trig Sub(PL)	19 **L5**
IBP (MP), Trig Int (MP)	22 Starts Clicker **L6**	23 Trig Sub (CC)	24 **L7**	25 Trig Sub (MP)	26 conflict, make up sign up deadline **L8**
PF case 1 & case 2	29 **L9**	30 PF case 3 & 4	31 **L11**	1 PF (MP)	2 Clicker registration deadline **L12**
Limit Review,	+Feb 5 **L13**	6 Sequence(PL)	7 **L14**	8 L'H	9 **L15**
Exam 1 Review, Improper,	12 **L10(Review)**	13 Sequence (CC) **Exam1 (L1- 13)**	14 **L16**	15 Series (CC) Sequence (MP)	16 **L17**
	19 **L18**	20 W.HW1 (L1-16) Series (MP)	21 **L19**	22 W. HW1 (L1- 16) Integral Test	23 **L20**
Comparison(CC)	26 **L21**	27 Comparison(MP)	28 **L22**	Mar 1 AST, Ratio Test	2 **L24**
Root Test	Mar 5 – Mar10 **Spring Break**				
Review Strategies for conv., Exam 2 Review	12 **L23(Review)**	13 **Exam2(14-23)**	14 **L25**	15 Power S. (PL)	16 **L26**
Radius & I(CC) and Functions as series (PL)	19 **L27**	20 Written HW2 (L17-28) Func as Series (CC)	21 **L27-L28**	22 Written HW2 (L17- 28) Func as Series (MP)	23 **L28**
Taylor (CC)	26 **L29(Review)**	27 Taylor (MP)& Parametric (PL)	28 **L30**	29 Review series	30 **L31**
E3 Review (I)	Apr 2 **L32**	3 Parametric (CC)	4 **L33**	5 Parametric (MP) Polar Coordinates	6 **L34**
Polar Curve (CC)	9 **L35(Review)**	10 E3 Rev. (II) Polar Curve (MP)	11 **Exam Review**	12 **Exam 3(L24-35)**	13 **L36**
Volume (PL)	16 **L36**	17 Written HW3 (L29- 35) Volume (CC)	18 **L37**	19 Written HW3 (L29-35)	20 **L37**
Volume (MP)	23 clicker alert **Review**	24 Final Exam Review	25 **Review** verify all grades	26 No Class Reading Day	27 No Class Reading Day

WebAssign online homework due dates in purple on Sunday, Tuesday and Thursday at 11:59pm
3 Written HW due dates in red.

*Evening Exam Time: 8:20 – 9:20PM. See Canvas for Exam locations.
- Cumulative Final Exam: Saturday, April 28, 12:30 PM – 2:30 PM.
- Clicker registration deadline – receive weekly report and verify & resolve weekly grade issues.
*clicker alert-Forfeit all clicker points if still have not resolved all clicker grade issues by 4/23.
*Verify and resolve all Canvas grades issues: 4/19-25. **Absolutely NO grades disputes after 4/26.**

COURSE GRADE: A student's grade will be based on 400 points accumulated as follows:

Lecture Participation (HITT clickers)	30
Online Homework (in WebAssign)	50
Written Homework (out of 3.5 points $\times$ <u>3</u>=10.5)	10
Discussion Quizzes (best 4 of 6, 5 points $\times$ <u>4</u>=20)	20
Semester Exams (70 points $\times$ <u>3</u>=210)	210
Cumulative Final Exam	<u>80</u>
	400

The course grade is determined by the number of points you earn, not by the percentage.

A	$360 - 400$ pts	C	$280 - 293$ pts
A$-$	$348 - 359$ pts	C$-^*$	$268 - 279$ pts
B+	$334 - 347$ pts	D+	$254 - 267$ pts
B	$320 - 333$ pts	D	$240 - 253$ pts
B$-$	$308 - 319$ pts	D$-$	$228 - 239$ pts
C+	$294 - 307$ pts	E	$0 - 227$ pts

- **There will be NO DROP on exam grades.**

- **Extra assignments or score adjustments for individual students to improve a grade are NOT possible.**

LECTURE PARTICIPATION:

- **H-ITT Clickers:**

  Attendance in lecture and in discussion are required. In lectures, students are required to have a working H-ITT clicker. You may also use softclick. Go to the Course Resources of the Module tab in Canvas to look up detail information about using the clicker /Soft Clickers.

  Starting approximately the third week of the semester, students will be required to have their clickers in class in order to participate in lectures. A weekly clicker grade report will be sent to students' UF email once you register your clicker **after** your first successful use in class. **It's students responsibility to verify the scores and fix any problems** <u>immediately</u>.

There are **NO MAKEUPS**, however there will be a small excess of clicker points given over the course of the semester to compensate for occasional absence, mechanical failures, forget to bring the clicker, etc.

A students is <u>not allowed</u> to respond in class for anyone else but himself/herself; a violation of this policy is considered cheating and will be handled according to standard University honor code policies.

NOTE:

– Register your clicker **after** your first successful use in lecture.

– If you are not receiving a weekly 'Clicker grade report' email after the 5th week, then you are most likely not properly registered. Contact the H-ITT representative (contact info is in Canvas Homepage) immediately to resolve all your registration issues.

– All clickers registration issues must be resolved before the Spring Break. If you have not received a "Clicker Grade Report" email by then and/or you are seeing a 0 score for you H-ITT clicker, then you are most likely not properly registered, expect to incur a severe penalty for allowing your clicker to go unregistered for as long as you did.

– Any student who have not properly confirmed their clicker is registered and as a result receives a 0 for their H-ITT Clicker Point Grade by Monday, April 23 will forfeit all their clicker points. You can not earn these points back even if they are the difference between passing and failing.

– Verify your grades in Canvas and contact your TA <u>immediately</u> if there are any recording errors. There will be absolutely **no discussion on any grade issues** after Thursday, April 26, except for possibly the final exam grade recording.

• **Lecture Notes Outlines:**

Your instructor will use a **LECTURE OUTLINE** (may be purchased at Target Copy on University Ave or, print online in Canvas). Bring it to each lecture.

ONLINE HOMEWORK in WEBASSIGN:

Students must purchase an access code for WebAssign (WA), which includes the text as an ebook and the online homework assignments. You have limited time (by 1/26/18) to 'opt-in' to WA once classes begin for a reduced price of $62.50 and pay for these materials through your student account. You will not be able to get the reduced price if you purchase WA from WA directly or from bookstores.

A print copy of the text is not required.

During the course of the semester, online assignments will be assigned on a routine basis and must be completed before the due dates listed in the course calendar. Students are responsible for having access to a working computer and have your work completed on time. Remember that Due Date is NOT Do Date. There will be **NO MAKEUPS NOR EXTENSIONS**. However, there will be excess points given to compensate for any technical difficulties you may encounter.

Always read the Description and Instruction in each assignment and pay attention to the number of submissions allowed in each question since they may be different depending on the types of the questions. (eg. True/False question has only one submission). **You should always click the 'SAVE' button each time you enter an answer**. The 'SAVE' does not reduce your number of submissions, it merely saves your answer in case any glitches happen, your last saved answer is kept in the system can be retrieved by your TA.

If you are having issues with WA in the beginning of the semester, please contact demasc@ufl.edu immediately. Afterwards, any WA issues must be directed to your TA and/or WA student support, https://webassign.com/support/student-support/ immediately.

WRITTEN HOMEWORK:

As you work out your online assignments, you have the opportunity to practice writing down your solutions algebraically, logically and thoroughly before you have to take quizzes and exams. Your written solution to these homework problems are collected by your TA three times in discussion for grades.

There will be no drops and students have to be present at the beginning of the class and stay the entire period in order to submit your homework. It's your responsibility to get your work to your TA before the end of the discussion. The work must be your own and not taken from any other sources and it is graded for completeness and accuracy. This is a good time to visit office hours if you need help with homework.

If you are present in discussion on the day of the collection but forget to bring your homework, make arrangement with your TA **before you leave the discussion**. You have 24 hours to turn in your ENTIRE homework with 1 point penalty. There are **NO MAKEUPS**. If you must be absent, contact your TA immediately (email or in person) to make prior arrangement to **turn it in early, not late**.

DISCUSSION QUIZZES:

Every student is registered to attend a weekly discussion session. This is where you have the opportunity of math discussions in a smaller class setting, take quizzes, turn in written homework and get quiz/homework/exam back. You must retain your returned work in case there are any grade issues.

Make-up Quizzes: There are **no make-ups on the first two missed quizzes**, regardless the reasons since we drop two quizzes.

You must have submitted at least 75% of all assignments and the class attendance in order to be considered for a possible make up quiz after the first 2 missed quizzes, then:

- If you are participating in a UF sponsored event or religious observance, you must make arrangement with your TA within the first three weeks. You must present a valid documentation.

- If you have a court-ordered obligation–see your TA ahead of time with a valid document to make arrangement.

- If illness or other extenuating circumstances cause you to miss a quiz, contact your TA (no later than 24 hours after the quiz) by email. Then, as soon as possible after you return to campus, bring the appropriate documentation to your TA's office hours to make arrangement to take a

make up quiz.

EXAMS:

During the semester there are three mid−terms and a cumulative final, all mandatory, none will be dropped. The mid−term exams are assembly exams which begins at 8:20PM, consist of multiple choice and free-response questions; the final exam time may change each term, consists solely of multiple choice questions. All exam dates and time are specified in the course calendar and they must be taken at the assigned date and time. If you have class or other exam conflict, please see **UF during Term Assembly Exam Policy** https://catalog.ufl.edu/ugrad/current/regulations/info/exams.aspx.

If MAC 2312 is the course to give the conflict exam, you must sign up with your instructor **by the sign up deadline** specified in the calendar to avoid penalty. This also applies to students participating in UF sponsored events and religious observance. In all cases, a valid document is required. If you have a court ordered obligation, see your instructor immediately with a valid document to make arrangement for a make up exam.

If illness or other extenuating circumstances causes you to miss an exam, you must contact your instructor (no later than 24 hours after the exam) by email, then as soon as you return to campus, bring the appropriate document to your instructor to sign up for a make up to avoid penalty.

The conflict exam will be offered from 7:10−8:10pm on the same night as the regular exam. You will not be permitted to leave the exam room before 8:20pm. All approved makeup exams will be given on the last Wednesday of the semester at 8:20pm. If you are approved to take the makeup, you will receive email instruction one week before the make up date. It's your responsibility to be sure you receive the instruction. Make up exams consist of multiple choices only.

Do not bring valuables to exams, bring only #2 pencils, one pen and your Gator1 ID card. Bubble your scantron carefully, there are 3 points penalty for incorrect UFID or Form Code. There are 3-point penalty if you do not take your exam in the assigned room for your section.

ADDITIONAL TOPICS:

All course information will be posted on Canvas which can be accessed using the link http://elearning.ufl.edu **. Use your Gatorlink credential to login to this site.**

One Week Policy: All grades are posted in the Canvas gradebook (except individual WA points which are accessed through the programs directly and the H-ITT grades which are sent to you weekly in your UF emails). You are responsible for verifying all grades are accurate. You have one week after a score is posted to discuss any grade concerns with your TA. There is no grades dispute after one week.

10− Minutes Policy: Only students who are present in the first 10 minutes and stay for the entire period are allowed to participate in class activities (including submitting clicker questions, taking discussion quizzes and turn in homework assignments). Go to the exams early since you will not be allowed into the exam if you are 10 minutes late, and no one is allowed to leave exam within the first 30 minutes.

Office Hours: After the first week, all TAs and instructors' office hours will be posted in Canvas. You may go to anyone's office hours that fit your schedule. We encourage you to use this valuable resource to help you stay on track and succeed. All three instructors' **LECTURES ARE TAPED**, you may access them in Canvas.

Attendance is mandatory if a student wishes to master the subject. Students may expect a grade penalty for attending fewer than 75% of your classes. You may also lose the opportunity to earn bonus points, if available. **Students are responsible for all announcements and lecture material covered in class and/or posted in Canvas.**

Honor Code: Academic dishonesty in any form will not be tolerated and will be treated in accordance with the policies of the University of Florida. You may find the Student Honor Code and responsibilities concerning academic honesty at the link www.dso.ufl.edu/sccr/. In addition, we remind students that lecture given in this class are the property of the University/faculty member and may not be taped without prior permission from the instructor and may not be used for any commercial purpose. Students found to be in violation may be subject to discipline under the Student Conduct Code.

Your TA is your first contact. Students are highly encouraged communicate with the instructors after class and during office hours. If you have personal/private issues and you can not make to office hours to discuss, you may then send emails. In order to put your email in the right context, please write in the subject line: **your lecture period, TA's name and section numbers.** Your course coordinator is teaching all three formats of the course with roughly 1000 students . It is crucial you provide these information in order to receive an email reply from your course coordinator.

Disability Resource Center (DRC): Students requesting classroom and exam accommodation must first register with the Dean of Students Office, www.dso.ufl.edu/drc/. This should be done at the earliest possible date so there is adequate time to make proper accommodations.

Extra Credit Opportunities: All students have the same extra credit opportunities. There is no makeup on these opportunities. Please do not ask for anything you can do to pass the course. No extra credit opportunities will be granted to any individual beyond what is available for the entire class.

ABOUT THE ONLINE WEBASSIGN ASSIGNMENTS:

For some of the students, this could be the first time seeing the challenging concepts in this course. To put these complex topics into perspectives so that students can conceptually break down the topics slowly and overtime become quicker with, the homework assignment is organized around a list of Learning Objectives that demonstrates mastery of the various topics in the course. These objectives fall into three categories:

- **Prelecture (PL)** objectives in which you may watch video, read from the textbook and work exercises to review algebraic skills, expose to the new material and to prepare yourself for the sections to come.

- **Concept Check (CC)** objectives that address basic terminology and computations based directly on theorems, definitions and examples of the section.

- **More Practice (MP)** objectives address higher-level tasks such as synthesis of multiple techniques and creative work through application.

The due dates for the WA homework are mapped out carefully so students do not forget one topic as you are learning another and helps reinforce previous knowledge.

WA assignments are spread out 3 times a week with smaller sets arranged by the topics to help students to stay on track and to understand the focus of each topic, rather than as one larger weekly assignment. This is to encourage students to focus on in-depth mastery of each topic rather than to merely meet a weekly deadline.

HOW TO BE SUCCESSFUL IN MAC2312

I want you to be successful in this class, I am on your side and will be working hard to make sure you always have the resources to have a clear path to success. But I cannot walk that path for you! It will take considerable effort on your part. To do this and be successful, you will need to do the following:

1. **Prepare diligently outside of class and come to class ready to work from the get-go.**

   (a) Get an early start on all assignments. (Internet is known to be down sometimes)

   (b) Work hard, work wholeheartedly; do your homework daily.

   (c) Review and master your lecture notes and assignments before the next class.

   (d) Watch the lecture again and/or visit office hours if you need help. Do not let questions go unanswered.

   (e) Do not practice until you get it, practice until you can't make mistakes.

2. **Actually come to class and actively engaged in your learning.**

   (a) Pay attention and answer questions, at least mentally, posed by your instructor in lecture.

   (b) Avoid inappropriate distractions in class such as Facebook texting or talking.

   (c) Stay on top of what's going on.

3. **Engaged and be active in your learning after class.**

    (a) Spend a minimum of 3 hours effectively studying outside of class for every hour you spend in class. So 12 hours a week preparing for this class outside the classroom.

    (b) The time you spend on MAC2312 is to spent purposefully, with a plan for what you will master and when you will do it as well as a plan for getting help if you get stuck.

    (c) Believe that your mathematical skills can be improved through dedication and hard work, and when you get it wrong, take it as a learning opportunity and get better by learning from your mistakes.

4. **Practice self-guided learning.** Pay attention not only to what you are learning but how you are learning it, and you are not depending upon the instructor or anyone else to learn things. In particular:

    (a) Be aware at all times of what you are supposed to be learning.

    (b) When you work, work purposefully. Some of the activities are ones that you make up yourself, such as study guides, similar problems to practice, even if no grade is involved.

    (c) If you see there is a gap between your abilities and the topics covered in lectures, take initiative to find things that will help you close it.

Free Help:

- Calc 2 Office hours −

    – Over 30 hours/week from MAC 2312 instructors and TAs;

    – Broward Teaching Center (https://teachingcenter.ufl.edu/vsi/);

    – LIT 215; visit any calc 2 TAs on duty.

    – Calc 2 Supplemental Instructor (SI); (see hours in Canvas)

    – Office of Academic Support (http://oas.aa.ufl.edu/tutoring.aspx).

- Taped lecture. (see Canvas)

I want you to be successful! Remember that you are the only person who can walk the path to your success. Your TA and I are there for you, but you need to stay on top of what's going on in class and take the initiative to reach out when you need help.

PREREQUISITES MATERIAL FOR MAC2311, 2312

This course assumes that you have a sound precalculus background. The following is a summary of some important concepts used in solving calculus problems. The textbook provides a more complete review of these essential topics.

ALGEBRA

1. Basic Geometric Formulas: ($b =$ base, $l =$ length, $h =$ height, $w =$ width)

   Triangle: area $= \dfrac{1}{2}bh$

   Circle: area $= \pi r^2$; circumference $= 2\pi r$

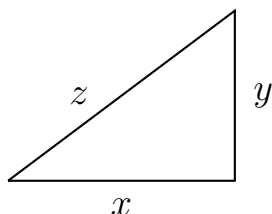   Parallelogram: area $= bh$

   Rectangular box: volume $= lwh$

   Sphere: volume $= \dfrac{4}{3}\pi r^3$; surface area $= 4\pi r^2$

   Right circular cylinder: volume $= \pi r^2 h$;   surface area $= 2\pi rh + 2\pi r^2$

   Right circular cone: volume $= \dfrac{1}{3}\pi r^2 h$;   surface area $= \pi r\sqrt{r^2 + h^2}$

   Facts about similar triangles

   Pythagorean theorem: $x^2 + y^2 = z^2$

2. Basic Functions and their graphs

$f(x) = x$; $f(x) = x^2$; $f(x) = x^3$; $f(x) = |x|$; $f(x) = \sqrt{x}$; $f(x) = 1/x$;

$f(x) = b^x$, $b > 0$ and $b \neq 1$, such as $f(x) = 2^x$

3. Factoring

$$x^3 + y^3 = (x + y)(x^2 - xy + y^2); \quad x^3 - y^3 = (x - y)(x^2 + xy + y^2); \text{ etc.}$$

4. Completing the square $x^2 + ax + b = \left(x + \dfrac{a}{2}\right)^2 + \left(b - \left(\dfrac{a}{2}\right)^2\right)$

5. Law of exponents $x^n y^n = (xy)^n; \quad x^n x^m = x^{n+m};$

$$\frac{x^n}{x^m} = x^{n-m}; \qquad (x^n)^m = x^{nm}$$

6. Roots

$$\sqrt[n]{x} = x^{\frac{1}{n}}; \; x^{-n} = \frac{1}{x^n}, \text{ etc.}$$

7. Inequalities and absolute values

$|x| \leq a \qquad -a \leq x \leq a; \qquad\qquad |x| > a \qquad x > a \text{ or } x < -a$

8. Properties of logarithms If $x > 0$, $\log_a x = y$ if and only if $x = a^y$

If $m > 0$ and $n > 0$, then

$$\log(nm) = \log(n) + \log(m) \qquad \log\left(\frac{n}{m}\right) = \log(n) - \log(m)$$

$$\log(n^c) = c\log(n) \qquad\qquad \log_b(x) = \frac{\ln(x)}{\ln b}$$

TRIGONOMETRY

1. Identities:

$$\sin(-\theta) = -\sin\theta \qquad \cos(-\theta) = \cos\theta \qquad \tan(-\theta) = -\tan\theta$$

$$\sin\left(\frac{\pi}{2} - \theta\right) = \cos\theta \qquad \cos\left(\frac{\pi}{2} - \theta\right) = \sin\theta \qquad \tan\left(\frac{\pi}{2} - \theta\right) = \cot\theta$$

$$\sin^2\theta + \cos^2\theta = 1 \qquad \sec^2\theta = 1 + \tan^2\theta \qquad \csc^2\theta = 1 + \cot^2\theta$$

2. Sum and Difference Formulas:

$$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$

$$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

3. Double Angle Formulas:

$$\sin 2\theta = 2 \sin\theta \cos\theta$$

$$\cos 2\theta = \cos^2\theta - \sin^2\theta = 2\cos^2\theta - 1 = 1 - 2\sin^2\theta$$

4. Half-Angle Formulas:

$$\sin^2\theta = \frac{1 - \cos 2\theta}{2} \qquad \cos^2\theta = \frac{1 + \cos 2\theta}{2}$$

5. Trigonometric Values:

θ	0	$\pi/6$	$\pi/4$	$\pi/3$	$\pi/2$
$\sin\theta$	0	$1/2$	$\sqrt{2}/2$	$\sqrt{3}/2$	1
$\cos\theta$	1	$\sqrt{3}/2$	$\sqrt{2}/2$	$1/2$	0
$\tan\theta$	0	$\sqrt{3}/3$	1	$\sqrt{3}$	undef

6. $\arctan x = \qquad$ at $x = 0, 1, \sqrt{3}, \dfrac{1}{\sqrt{3}}$

PREREQUISITES MATERIAL FOR MAC2312

This course assumes that you have a sound calculus 1 background. The following is a summary of some important concepts and formulas used in solving calculus problems. The textbook provides a more complete review of these essential topics.

FORMULAS YOU ARE EXPECTED TO KNOW

1. COMPLETING THE SQUARE:

$$x^2 + ax + b = \left(x + \frac{a}{2}\right)^2 + \left(b - \left(\frac{a}{2}\right)^2\right)$$

2. PARABOLA:

$$y = f(x) = ax^2 + bx + c, \text{ vertex } (h, k), \text{ where } h = -\frac{b}{2a}, \text{ and } k = f\left(-\frac{b}{2a}\right)$$

3. CIRCLES:

$$(x - a)^2 + (y - b)^2 = r^2, \qquad \text{Center at } (a, b), \text{ radius} = r$$

4. DERIVATIVES OF AN INVERSE FUNCTION:

$$\text{If } g = f^{-1}, \text{ then } g'(x) = \frac{1}{f'(g(x))}$$

5. DIFFERENTIATION/INTEGRATION FORMULAS:

CHAIN RULE $\quad (f(g(x)))' = f'(g(x))g'(x)$

PRODUCT RULE $\quad (f(x)g(x))' = f(x)g'(x) + g(x)f'(x)$

QUOTIENT RULE $\quad \left(\dfrac{f(x)}{g(x)}\right)' = \dfrac{g(x)f'(x) - f(x)g'(x)}{(g(x))^2}$

$$\frac{d}{dx}(x^n) = nx^{n-1}$$

$$\int x^n \ dx = \frac{x^{n+1}}{n+1} + C$$

$$\frac{d}{dx}(\ln x) = \frac{1}{x}$$

$$\int \frac{1}{x} \ dx = \ln|x| + C$$

$$\frac{d}{dx}(e^x) = e^x$$

$$\int e^x \ dx = e^x + C$$

$$\frac{d}{dx}(a^x) = (\ln a)a^x$$

$$\int a^x \ dx = \frac{a^x}{\ln a} + C$$

$$\frac{d}{dx}(\sin x) = \cos x$$

$$\int \cos x \ dx = \sin x + C$$

$$\frac{d}{dx}(\cos x) = -\sin x$$

$$\int \sin x \ dx = -\cos x + C$$

$$\frac{d}{dx}(\tan x) = \sec^2 x$$

$$\int \sec^2 x \ dx = \tan x + C$$

$$\frac{d}{dx}(\cot x) = -\csc^2 x$$

$$\int \csc^2 x \ dx = -\cot x + C$$

$$\frac{d}{dx}(\sec x) = \tan x \sec x$$

$$\int \tan x \sec x \ dx = \sec x + C$$

$$\frac{d}{dx}(\csc x) = -\cot x \csc x$$

$$\int \cot x \csc x \ dx = -\csc x + C$$

$$\frac{d}{dx}(\arcsin x) = \frac{1}{\sqrt{1-x^2}}$$

$$\int \frac{1}{\sqrt{1-x^2}} \ dx = \arcsin x + C$$

$$\frac{d}{dx}(\arctan x) = \frac{1}{1+x^2}$$

$$\int \frac{1}{1+x^2} \ dx = \arctan x + C$$

$$\frac{d}{dx}[f(g(x))] = f'(g(x))g'(x)$$

$$\int f(g(x))g'(x) \ dx = \int f(u) \ du$$

$$\int \tan x \ dx = \ln|\sec x| + C \ \text{ or, } \ -\ln|\cos x| + c$$