

**MAC 2312: Calculus II**  
**Online Version**  
**Fall 2015**

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**TEXT:** Calculus, Early Transcendentals by Rogawski, 2e

ISBN-10:1-4292-0838-4; ISBN-13:978-1-4292-0838-3

The text book is accessible as an ebook through WebAssign access code.

Two pricing options for purchasing the WebAssign Access Code:

- \$50 single term access to e-book and online homework
- \$35 single term access to online homework only

**LECTURE OUTLINES:** Available for printing from CANVAS

Course homepage is on Canvas: <https://lss.at.ufl.edu>

Online Homework & Quiz: [www.webassign.net/ufl/login.html](http://www.webassign.net/ufl/login.html)

UF Tutoring Service: [www.teachingcenter.ufl.edu](http://www.teachingcenter.ufl.edu)

**MAC 2312 -- ANALYTIC GEOMETRY & CALCULUS II**

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## MAC 2312 Online Course Calendar

Fall 2015

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Sunday
1	8/24 Class begin <b>L1</b> Introduction	8/25	8/26 <b>L2</b>	8/27	8/28 <b>L3</b>	8/29
2	8/31 <b>L4</b>	9/1	9/2 <b>L5</b>	9/3*Diag-Quiz *Syllabus Quiz	9/4 <b>L6</b>	9/5
3	9/7 No Class	9/8 * HW1, LQ1 – 5	9/9 <b>L7</b>	9/10	9/11 <b>L8</b>	9/12
4	9/14 <b>L9</b>	9/15 HW2, LQ6 – 8	9/16 <b>L10</b>	9/17	9/18 <b>L11</b>	9/19
5	9/21 <b>L12</b>	9/22 HW3, LQ9 – 11	9/23 <b>L13</b>	9/24	9/25 <b>L14</b>	9/26
6	9/28 <b>L15</b>	9/29 HW4,Q1, LQ12- 14	9/30 *ER,*D-Post	10/1 <b>EXAM 1</b>	10/2 <b>L16</b>	10/3
7	10/5 <b>L17</b>	10/6 HW5, LQ15 – 16	10/7 <b>L18</b>	10/8	10/9 <b>L19</b>	10/10
8	10/12 <b>L20</b>	10/13 HW6, LQ17 – 18	10/14 <b>L21</b>	10/15	10/16 <b>L22</b>	10/17
9	10/19 <b>L23</b>	10/20 HW7, LQ19 – 21	10/21 <b>L24</b>	10/22	10/23 <b>L25</b>	10/24
10	10/26 <b>L26</b>	10/27 HW8,Q2, LQ22 – 23	10/28 ER, D-Post	10/29 <b>EXAM 2</b>	10/30 <b>L27</b>	10/31
11	11/2 <b>L28</b>	11/3	11/4 <b>L29</b>	11/5	11/6 No Class	11/7
12	11/9 <b>L30</b>	11/10 HW9, LQ24 – 26	11/11 No Class	11/12	11/13 <b>L31</b>	11/14
13	11/16 <b>L32</b>	11/17 HW10, LQ27 –29	11/18 <b>L33</b>	11/19	11/20 <b>L34</b>	11/21
14	11/23 <b>L35</b>	11/24 HW11, LQ30 –32	11/25- 11/28 <b>Holiday</b>			
15	11/30 <b>L36</b>	12/1 HW12,Q3,LQ33 –35	12/2 ER, D-Post	12/3 <b>EXAM 3</b>	12/4 <b>L37</b>	12/5
16	12/7 <b>MakeUp Exam</b>	12/8 HW13,Q4,LQ36 –37	12/9 ER, D-Post	12/10 No Class	12/11 No Class	12/12 <b>Final</b>
16	<b>FINAL EXAM(L1 – L37):</b> Saturday, Dec. 12, open from 9am – 10pm EST (Schedule a 135 min. time block with Proctor U at least a week in advance.)					

ER = ExamReviewQuestions,                      LQ=Lecture Questions,                      D-Post = Discussion Board Posting

\* All dates listed are the final due dates of the indicated tasks.

**All Assignments and Exams are due by 10:00PM EST.**

– Unit Exams available from 9am – 10 pm EST must be scheduled with Proctor U at least a week in advance.  
Schedule a 105 min. time block for each unit exam. Do the same for preapproved make up exam.

–**Exam 1** (L1-L13), **Exam 2** (L14-:23). **Exam 3** (L24-L35). **Final** (L1 – L37)

## 2. INTRODUCTION

**2a. COURSE DESCRIPTION AND CONTENT.** MAC2312, Calculus II, is the 2<sup>nd</sup> semester in a three semester calculus sequence. The course begins where MAC2311 left off at the integration techniques. This is followed by a study of sequences, series and parametric equations and closed with applications of definite integrals including volumes of solids and solids of revolution.

A minimum grade of C (not C –) in MAC 2312 satisfies four credits of the University General Education Mathematics requirement.

This is an ONLINE VERSION of MAC2312 – all content is delivered online. Students view 37 online lecture videos and complete lecture questions in the course management system Canvas, and complete online homework and quizzes using WebAssign (WA) software. Students are encouraged to post questions and answers on the course Discussion Board in Canvas. Three semester unit exams and a final exam are posted in WA and administered through ProctorU.

**2b. PREREQUISITES.** MAC2312 assumes that you have essential precalculus (both algebra and trigonometry) and calculus I skills necessary to succeed in calculus II. Students should be able to do the work without a calculator. In the last section of this syllabus, students may find a short list of **review materials** to practice.

We encourage students to review the prerequisite material to gain a strong knowledge in order to succeed in calculus II. A **Diagnostic quiz** in WebAssign is due on the second Thursday of the semester. You should already be competent in working this material. We recommend students who are having difficulty with the review material or the Diagnostic Quiz consider first taking MAC2311 (if you have not successfully completed the course) which is offered as an UF online course. You may switch courses on ISIS, [isis.ufl.edu](http://isis.ufl.edu), during the drop-add period. Students may also use the ALEKS Remedial Program to strengthen pre-calculus skills. For more complete information on ALEKS, check the page [isis.ufl.edu/aleksinfo.html](http://isis.ufl.edu/aleksinfo.html).

### 2c. REQUIRED MATERIALS.

**WebAssign (WA):** is where most of the Math assignments are done. Here you'll do your homework, quizzes, and Exams. You need WA Access Code to access the site. You may purchase the code online at [www.webassign.net/ufl/login\\_html](http://www.webassign.net/ufl/login_html) or from UF or other local bookstores. You have a two week grace period to use WA before you must pay for continuing access. The **Textbook** can be accessed as an ebook, one of the WA access code options, or purchased in a bundle (a hard copy plus access code) or, you may purchase an used copy of the text book from bookstores or online vendors. A copy of the text book and the solutions manual are NOT required, but certainly will be good reference for future use. **Note:** We do not recommend purchasing *used bundle* online since the access code may not function correctly.

**Lecture Notes Outlines:** See 2f.

**Computer access and requirements:** All assignments should be taken on a computer, not cell phone or tablet, since there may be compatibility issues with CANVAS and WA. Be sure you are using a browser that works with WA. Any WA questions should be directed to the WA helpdesk or the teaching assistant (TA) for the course. Check here, [http://www.webassign.net/manual/student\\_guide/c\\_a\\_system\\_requirements.htm](http://www.webassign.net/manual/student_guide/c_a_system_requirements.htm), for WA browser recommendations.

**You are responsible for having access to a working computer and have your work completed on time.** Complete your work early. If you wait and run into any difficulties to submit your work, you will be out of luck because there is no extension for the work not submitted.

**Calculators:** A graphing calculator or computer program can be useful as a learning tool when used appropriately, but they are not essential. Calculus is a collection of concepts, ideas and process that are not mastered through calculator skills. No calculators are allowed during exams.

**2d. COURSE CALENDAR.** Check the course calendar and ‘Assignment Due Dates’ in Syllabus for due dates and plan your schedule accordingly.

**2e. CANVAS.** is the hub of the course. It’s where you will access important course information such as the lecture videos and lecture questions, grades and the syllabus, or post your course questions in the Discussion Boards or view exam information. It is run by UF, and you will need your gatorlink ID and password to access it. The website address is <https://lss.at.ufl.edu>. In addition, there is a mail tool, announcement, discussion board and Conference for communication.

All grades are posted in Canvas (except for the individual WA homework and quiz scores which are accessed in your WA gradebook). **You are responsible for verifying all grades are accurate. You have one week after a score has been posted to resolve any grade concerns.** Contact the course TA if you believe there has been a grading or recording error. **We will not consider these grading disputes at the end of the semester.**

**Please note:** Important course information is clearly communicated in this course guide and assignments and course materials are easily accessible through CANVAS. If you can not find your answer in the resources above, there is also a Discussion Board available in Canvas. Please use this to post questions and to supply answers to your fellow students. The course TA will check this board regularly.

**2f. LECTURE VIDEOS.** The lecture videos provide the main presentation of course material, and are accessed through Canvas. To stay current with the course, we recommend watching the lecture video weekly following the schedule posted on the course calendar. You should watch the lectures and answer the corresponding Lecture Questions before attempting homework. It's possible for you to get ahead in the class if you complete each assignment early. However, the test dates will not change.

**Lecture Notes outlines:** you can download and print them out from each lecture in Canvas. It is important that you should have a hard copy of the lecture notes in order to follow the online lecture presentations when watching the videos. This will make it easier to take notes and to follow the lecture. Please post questions on the course discussion board or contact your instructor if you need clarification of a topic. The [Broward Teaching Center](#) at UF provides online support and is a valuable resource.

**Note:** The lecture note outlines and other documents posted in Canvas are in PDF format which requires Acrobat Reader on your computer. You may download the latest version through <http://get.adobe.com/reader/>.

**2g. SUCCESS:** Other than having a strong precalculus and calculus I background, success in MAC 2312 depends largely on your attitude and effort. Keeping up with the videos is critical. You may find it beneficial to work daily on the material as opposed to saving it all for one day. It is not effective to watch video and copy notes without following the thought processes involved in the lecture. For that reason, there are **Lecture Questions** following each lecture which you will answer in Canvas as part of your course grade. (see 3d)

Be aware that much of the learning of mathematics at the university takes place outside of the classroom. You need to spend time reviewing the concepts of each lecture from the video and text book **before** you attempt homework problems. It is also important to look over the textbook sections to be covered in the next lecture to become familiar with the vocabulary and main ideas before watching the next video. That way you will be able to grasp the lecture material better. As with most college courses, you should expect to spend a **minimum** of 3 hours working on your own for every credit hour of the class. MAC 2312 is a 4 credit hour course, which means **at least 12 hours per week** preparing for this course and additional hours spent watching the lecture videos.

It is critical that you keep pace with the course material presented each week. Do not fall behind. Do not let misunderstandings go unanswered.

We encourage students to work together, and an important resource to facilitate communication in an online course is the MAC2312 **Discussion Board** in CANVAS. You should check the Discussion Board regularly, posting questions and answers for fellow students. The effort of asking questions and communicating ideas clearly, as well as the practice of writing solutions,

are effective tools in helping you better understand calculus concepts. The teaching assistants for the course will also check and answer the Discussion Board regularly. This is YOUR forum, take advantage of it by participating in it.

In studying calculus, you must be careful not to let a tutor, friend or calculator ‘think’ for you. Be sure that you can work problems completely on your own, writing out mathematics systematically and logically without help, even it is not collected, before your quiz or exam.

Use the resources available as you study! We encourage you to seek **help** from your TA, instructor, and to use the [Broward Teaching Center](#), for free online tutoring services and exam reviews, [www.teachingcenter.ufl.edu/vsi/](http://www.teachingcenter.ufl.edu/vsi/). WA also offers videos, and other study aids.

**Our hope is that through focused study and practice you will gain a true appreciation for the important concepts of calculus and their application. We want you to succeed in this class! But you must keep up with the course material and take the initiative to get help in time, before you get too far behind. Students with a positive attitude who are intellectually engaged in learning the material will get the most from the course.**

**2h. STUDENTS WITH DISABILITIES.** Students requesting class and exam accommodations must first register with the [Dean of Students Office Disability Resource Center \(DRC\)](#), (352-392-8565) and should approach the instructor as soon as possible, at least one week before the first exam, to ensure adequate time to make arrangements.

**2i. ACADEMIC HONESTY.** On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.”

**Violations of the Academic Honesty Guidelines shall result in judicial action** and subject to the sanctions in paragraph XIV of the Student Code of Conduct”.

The mathematics department expects you to follow the Student Honor Code. We are bound by university policy to report an instance of suspected cheating to the proper authorities. You may find the Student Honor Code and read more about student rights and responsibilities concerning academic honesty at the link [www.dso.ufl.edu/sccr/](http://www.dso.ufl.edu/sccr/).

In addition, we remind you that **lecture videos are the property of the University/faculty member and may not be used for any commercial purpose.** Students found to be in violation may be subject to discipline under the Student Conduce Code.

### **3. GRADING AND COURSE REQUIREMENTS**

3a. COURSE GRADE. Your course grade is based on 400 points accumulated as follows:

13 WA homework sets (50 pts)	40 pts
4 WA quizzes (8 pts x 4 =32)	25 pts
37 Lecture Questions sets	40 pts
3 Semester Exams (65pts/ea)	195 pts
<u>Final Exam (100 pts)</u>	<u>100 pts</u>
Total:	400 pts

In addition, there are **extra credits** worth 20+ points earned from the following assignments: Diagnostic Quiz, Syllabus Quiz, the Exam Review Questions, and posts on the Discussion Board relating to each exam review. Due dates are listed in calendar and in Assignment Due Dates.

**There will be no additional curve in this course, and extra assignments for individual students to improve a grade are NOT possible.**

Your course grade will be determined according to the following scale:

A	360 – 400	C	268 – 295
A –	348 – 359	C – *	256 – 267
B +	336 – 347	D+	240 – 255
B	320 – 335	D	228 – 239
B –	308 – 319	D –	216 – 227
C+	296 – 307	E	< 216

\*Note: A grade of C– DOES NOT give University General Education credit!

For those taking the S – U option: S[268 to 400 points] U[0 to 267]

Approval of the S – U option must be obtained from your instructor and approved by the registrar’s office. Further information about the S – U option are found in the undergraduate UF Catalog. For a complete explanation of current grade policies, refer to the [UF undergraduate catalog](#).

**3b. INCOMPLETE GRADE.** A student **who has completed a major portion of the course with a passing grade** but is unable to complete the final exam or other course requirements due to illness or emergency may be granted an incomplete, indicated by a grade of “I”. This allows the student to complete the course within the first six weeks of the following semester. The student must contact the course instructor before finals week for departmental approval and must provide documentation of the extenuating circumstances preventing him or her from taking the final exam. **The grade of “I” is never used to avoid an undesirable grade, and does not**



**allow a student to redo work already graded or to retake the course.** See the official policy at <http://www.math.ufl.edu/department/incomplete-grades/>

**Missing a final exam due to negligence,** however, will result in a minimum 10–point penalty.

### **3c. GETTING STARTED, SYLLABUS QUIZ(bonus). DIAGNOSTIC QUIZ(bonus).**

In Canvas you will find the Start Here page. Watch the Introductory video and the read the syllabus. After you feel comfortable with the course policies listed, take the **Syllabus quiz** posted in Canvas for extra credit. You also earn extra credits from completing the **Diagnostic quiz in WA**. The syllabus quiz is to make sure you understand what is expected of you in this course and the Diagnostic quiz provides a review of the required precalculus and calculus I skills. ( See 3h for more details). After completing the introductory part, you are ready to move to the main content: L 1 – L 37.

**3d. VIDEOS AND LECTURE QUESTIONS.** MAC2312 is organized into 37 lectures in Canvas, each lecture has an introductory page including the concepts to be covered, things you need to do and the due dates for this lecture. From there you may link to the lecture videos, a copy of the note outlines for each lecture and the Lecture Questions. Viewing the lecture presentations is an important aspect of the learning process. There are several lecture questions to be completed with each lecture. You will earn points by completing lecture questions ( $LQ_n$ ) by the specified due dates. You should work these problems after you watch the lectures and then enter your answers directly in Canvas. We encourage you to use the text as well as the videos or discussion board to help answer these questions which are not timed, but have limited submission. The total  $LQ_n$  points you earn will be scaled to 40 points towards the course grade.

**3e. WEBASSIGN ONLINE HOMEWORK.** The online homework administered in WebAssign is planned to review concepts and provide practice of the lecture material. There are 13 sets of Online homework assignments during the semester and they must be completed and submitted by the specified due date.

The homework problems are graded by the WebAssign software and you see your score immediately after submitting your work. You will have unlimited time before due date and 10 attempts for each problem, there are aids and a link to the ebook to help you solve questions.

**There are no makeups, no drops for online homework. Do not try to complete an assignment in one sitting; start early instead of waiting till the due date to avoid missing the deadline.** NOTE: **The homework will be closed for good for submission after the deadline,** but remains open for review and practice.

NOTE: If you missed a due date, go to the next one in order to not fall behind in the course.

**3f. WEBASSIGN QUIZZES.** Four quizzes will be posted in WebAssign to be due on the dates listed in the course calendar. You must achieve at least 75% on the corresponding homework set in order to open that quiz. If you are unable to take a quiz, your grade will be zero. You will have three attempts for each quiz and 3 hours to complete it; **the clock starts from the moment you open your quiz and continues even if you log out your quiz or turn off your computer. DO NOT wait until the last minute to submit your quiz; we will not extend time for any reasons including computer issues or WebAssign server problems.**

Like any in-class quiz, you will not know if your answers are correct when you take a quiz. The 3 attempts are there to give you a chance to review the material, erase an undesired answer and enter an updated answer, but you will not see any results until the due date has passed. After the due date, you may see your quiz scores and review the questions missed in the WebAssign gradebook. When work in WA, you must always click the 'SAVE' button to save your answer.

The WebAssign Homework and Quiz are open book and open note. You may have a tutor help you with the homework, but NOT the quiz.

Your total score on online homework will count up to a maximum of 40 points, and up to 25 points for the quiz, but the total number of points available are higher to offset possible credit lost due to technical difficulties.

If you are experiencing a problem with logging in, registration, or WebAssign in general, please contact WebAssign Support. Their contact information is on their homepage.

**3g. EXAMS:** There are three unit exams and one final exam. You must contact Proctor U at least a week in advance to schedule a 105 minutes (90+15 extra min.) time block for each unit exam and a 135 minutes (120+15 extra min) time block for the final exam. See 4a for more info.

### **3h. EXTRA CREDIT.**

You may earn at least 20 additional points beyond the required graded work in the following ways:

1. **SYLLABUS QUIZ** (3 points), **DIAGNOSTIC QUIZ** (3 points). These are to introduce you to the format of the course, and to provide a review of the required precalculus and calculus I skills. They are not timed with 3 submissions. See course calendar for due dates.
2. **EXAM REVIEWS** (3 points x 4=12 points). Before each of the exams an Exam Review will be posted in Canvas to be due the evening before each exam for extra credit. It is not timed, 10 submissions to be turned in by the due dates.

3. **DISCUSSION BOARD** (1point x4=4 points). We encourage you to use the Discussion Board regularly to ask and answer questions about the course material and homework. In addition, you may earn extra credit by posting a question and answering at least one question posted by another student for each exam review. Posting just the screen shots of WA questions without indicating your effort in attempting the question does not give you extra credit. Questions must be appropriate and relate to the course material to earn credit. These are due on the evening before each exam indicated on the calendar so you will need to start reviewing for the exam early in order to participate.

**3i. ADDITIONAL PRACTICE PROBLEMS.** There are problems listed in each lecture in the note outlines, called 'Now You Try It'. These were written by the course coordinator and are designed to emphasize the important concepts and practice of the lecture material. These problems are not graded, but it is strongly encouraged that you work as many as possible. Answers are posted along with the problems in the notes.

#### **4. TESTING.**

**4a. SEMESTER UNIT EXAMS.** During the semester, three unit exams will be given on the dates shown in the course calendar. The exams will be given in WebAssign and administered through ProctorU. You will take the exam in a 105 minute time slot between 9am and 10pm EST. You must register with ProctorU at <http://go.proctoru.com> for each exam at least a week in advance. See instructions on our homepage in Canvas. Each exam will be scored on a scale of 0 to 65 points and will consist of 20 multiple choice questions. You have 6 submissions for each question. You will see your score immediately after submitting the exam and you will be able to review your exam any time after the day of the exam.

**4b. FINAL EXAM.** A mandatory, comprehensive final exam offered in WebAssign will be given on the date shown in the course calendar. You will need to register with ProctorU at least a week in advance to schedule a 135 minutes time block between 9am – 10pm EST. The exam will consist of 25 multiple choice questions graded on a scale 0 to 100 points. You have 6 submissions for each question. The final is required of all students.

**Note:** You may NOT use a calculator or any other study aid for exams. Be sure to read the ProctorU handout thoroughly to understand the exam procedures before you start a test.

**4c. MAKEUP POLICIES.** All makeup work must be approved by the course TA and completed by the last Monday of the term, except for the final.

1. **Makeup – Exams:** To be eligible for a make up exam with no penalty, you must sign up with the TA at least two weeks prior to the exam date (unless last minutes emergency) with valid documented excuses. Otherwise, a 10-point penalty incurs. If you fall ill at the last minute, you must contact the TA within 24 hours with a valid documentation for approval to reschedule the exam with ProctorU.
2. **Makeup – WebAssign Homework and Quizzes:** With the extended availability of online homework, along with more possible points than allowed, we **do not** provide makeups for online work. You must start your homework and quizzes in plenty of time to allow for computer issues.
3. **Other makeups:** There are **no** make ups on the Diagnostic Quiz, Syllabus Quiz, Discussion Board Posts, Lecture Questions and Exam Reviews.

We do not accept any late excuse documentation. Assignments and Exams will not be reopened, reviewed, offered or graded after the last day of the semester.

If you are approved for a makeup, you are responsible to schedule it at least a week prior with ProctorU for a 105 minutes time slot between 9AM – 10PM EST (see calendar).

## 5. PREREQUISITES AND FORMULAS.

This course assumes that you have a sound precalculus and calculus 1 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.

COMPLETING THE SQUARE       $x^2 + ax + b = (x + \frac{a}{2})^2 + (b - (\frac{a}{2})^2)$

LAW OF EXPONENTS       $a^{n+m} = a^n a^m$        $a^{n-m} = \frac{a^n}{a^m}$        $(a^m)^n = a^{mn}$

PROPERTIES OF  $\log |x|$        $\log_b |xy| = \log_b |x| + \log_b |y|$

$$\log_b \left| \frac{x}{y} \right| = \log_b |x| - \log_b |y|$$

$$\log_b |a^m| = m \log_b |a|$$

PARABOLA       $y = f(x) = ax^2 + bx + c$

CIRCLES       $(x - a)^2 + (y - b)^2 = r^2$

Vertex       $x = -\frac{b}{2a}, y = f(-\frac{b}{2a})$

Center       $(a, b), \text{ radius} = r$

### Derivatives

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

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

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

### Integrals

$$\int \frac{1}{x} dx = \int e^x dx = \int a^x dx =$$

$$\int \sin x dx = \int \cos x dx = \int \tan x dx = \int \cot x dx =$$

$$\int \sec^2 x dx = \int \csc^2 x dx = \int \sec x \tan x dx = \int \cot x \csc x dx =$$

$$\int \tan^2 x dx = \int \cot^2 x dx = \int \frac{1}{a^2 + x^2} dx =$$

### Trig Identities

$$\sin^2 x + \cos^2 x = 1 \quad \tan^2 x + 1 = \sec^2 x \quad 1 + \cot^2 x = \csc^2 x$$

$$\sin^2 x = \sin 2x =$$

$$\cos^2 x = \cos 2x =$$

know values of  $\sin x$ ,  $\cos x$ ,  $\tan x$  at  $x = 0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}$ ;  $\arctan(a)$  at  $a=0, 1, \sqrt{3}, 1/\sqrt{3}$ .

(know the values of the other trig. functions at these angles and know the values of all trig functions at complementary and supplementary angles of the angles above)

### Chain Rules

$$(f(g(x)))' = f'(g(x))g'(x)$$

### Derivative of an Inverse

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