Calculus II
MATH 202 Section ST, Fall 2015
T, Th 6 – 7:40pm in room NAC 4/115

Instructor: Jhevon Smith
Email: JhevonTeaches@gmail.com
Office Hours: By appointment. Also see tutoring times below.
My Website: http://math.sci.ccny.cuny.edu/people?name=Jhevon_Smith
Text: Stewart, *Essential Calculus*, 2nd Edition.
Math Dept.: NAC 8/133   **Math Dept. website:** http://math.sci.ccny.cuny.edu
Math 202 website: http://math.sci.ccny.cuny.edu/courses?name=Math_20200

Websites: I gave you my website since I will be posting documents and instructions for the class there, such as: review problems, announcements, solutions to tests and quizzes, etc. I gave you the math 202 website because you will need to go to that website to access past finals, and other study materials, etc. I gave you the math. dept. website because, well, you should have it.

Calculator: Calculators are *NOT* permitted on any quiz or exam in this course. You may need calculators for certain problems in the homework, but I encourage you to try and do without a calculator as much as possible to create good habits. Several math classes you may have to take after this would also not permit calculators.

Grading: Grades will be assigned according to the following chart.

Letter Grade	G.P.A.	Grade	Letter grade	G.P.A.	Grade
A+	4.00	98-100	C	2.00	74-76
A	4.00	94-97	**C-**	**1.66**	**70-73**
A-	3.66	90-93	**D**	**1.00**	**60-69**
B+	3.33	87-89	**F**	**0**	**Below 60**
B	3.00	84-86			
B-	2.66	80-83			

You need a C to pass this course and move on to the next, MATH 203. However, for majors that would require a math sequence involving math 202 (science, engineering, math, etc), an A would be much more appropriate, so aim for that. Want to aim for an A+, even better!

As department policy demands, the final exam is worth 40% of your grade in this course. The remaining 60% will come from your in-class grade. The breakdown is as follows:

Quizzes: 20% (Expect *at least* once per week. Two quiz grades will be dropped.)
Written Homework: 5% (I will drop the worst two.)
Participation: 5% (Based mostly on attendance.)
In-class tests: 30% (I will give 4 exams and count the best 3.)
Final Exam: 40% (This will be a cumulative exam given at the end of the course.)

Make-up Exams/Quizzes: No way… Don't miss any test or quiz!

Attendance: Attendance will be taken at the beginning of class. You are *late* if you arrive after your name is called. You are considered *absent* if you arrive more than 15 minutes late. If you are late twice, that is considered as one absence. You will be assigned a WU (failing) grade if you accumulate 5 unexcused absences.

To be excused for an absence (or lateness) you must email me no later than one day after that particular absence (or lateness) with the reason. Of course, proof is required where applicable. For example, if your absence or lateness was due to a doctor's appointment, I expect to see a doctor's note. If you miss a class, it is your responsibility to catch up. You can see me during my office hour to discuss what was done in class, or catch up on your own. It's up to you. **To reiterate, there is no make-up for a missed quiz/homework/exam. Seriously! I drop your lowest scores to make up for the fact that there are no make ups.**

<u>**My Expectations:**</u>
Work ethic: You are not to slack off (more on this in class)! You are to read ahead! Very Important! Read each section before coming to class. It's better if you have your mind working on the concepts before coming to class—it will be easier for you to keep up and ask intelligent questions.

Homework: Assigned homework will be collected at the beginning of the class when it's due. We will review each homework in class, so be prepared to discuss your attempts and ask questions. The homework for a section is due once I complete that section in class (whether I announced that I completed it or not. Ask me if you're not sure, or follow along in the text). **Late homework will NOT be accepted.** *The excuse does not matter.* I will drop two homeworks to make up for the fact that late ones cannot be handed in.

I expect your hand-in homework to follow certain guidelines (**you lose points otherwise**):
(1) Show all your work. This goes for homework and *everything* else you do in this class—besides some quizzes. If anything at all can be written down to show how you got from point A to B, then write it!
(2) Your homework must be stapled if it consists of more than one page.
(3) Your homework must be properly labeled: **Your name, the HW number *and* topic(s)** (see the syllabus for what these are).
(4) Only ONE HW number per stapled group.
(5) Be neat! And write legibly, for Pete's sake!

I also expect you to remember the math that you have done before this course. Math is cumulative. Each math class builds on the class that came before it. If you are not good at pre-algebra, then algebra will be difficult, and so on. Be sure you've mastered the level of math that came before this. I will assume you are all experts at the lower level math courses. If this is not currently true for you, make it true, quickly; like by the end of the week.

Now, the matra.

Repeat the following to yourself 10 times a day. Five times when you wake up and five times before you go to sleep.

I must NOT cancel across sums,
I must NOT distribute powers across sums,
I must NOT divide by zero,
All these are blasphemy!
But I will use brackets when appropriate.

So yeah, the above may seem like a joke, and it is somewhat, but here's the part that's not funny: **do NOT commit any of the blasphemies mentioned above! Doing so will result in an instant zero (0) on any exam or quiz in which such an offense is made! Regardless of how well you did otherwise.**

There are other offenses that will incur a similar penalty. Making any one of the following mistakes will result in you getting a zero for the problem you make the mistake in.

1) Making the mistake of thinking $\int 1/x^n \, dx = \ln(x^n) + C$ (this is NOT true unless $n = 1$!!!). This includes thinking that $\int \frac{1}{f(x)} dx = \ln(f(x)) + C$ when $f(x)$ is *not* a monic linear polynomial.
2) Making the mistake of thinking the derivative (or integral) of a product (or quotient) is just the product (or quotient) of the derivatives (or integrals). That sounded confusing, I'll explain this in class.

Avoid these mistakes at all costs. I will punish you severely for making them. And yes, "+C" is required when computing an indefinite integral.

Contact: <u>You are to email me at the end of the first day of class, stating your name, your course and its section. I will deduct 5 points off your final grade if you fail to do this.</u> I will be emailing important information from time to time; including progress reports, announcements and advice as needed. Please read the emails. If I email you, it means it is important—important enough for me to take the time to write an email so that you will have it in writing.

Feedback: I encourage you to give me feedback about my teaching or the class, whether positive or negative (just make it constructive please). You can email me or talk to me, or if you don't want to reveal your identity, there is an anonymous feedback page on my website.

Help: FREE tutoring is available in the Marshak Building, room 418S. I am also a tutor there. The hours for this semester are: Mondays through Thursdays 12pm – 5pm and Fridays 12pm – 4pm. The tutoring center will be open starting September 1st. There are also online resources available. A great place to get math help, even at odd hours, is www.mathhelpforum.com. There are a significant number of brilliant people from varying time zones who decide to spend their free time helping others with math. Take advantage of this great service. Another great resource on the web is wolframalpha.com. You can use that site to check your answers. Brilliant site. Of course, there are other online contenders like YouTube, Khan Academy, etc. Check them out. Google is your friend…and big brother. And don't forget your classmates. You should get the contact information of at least one person that you can study with or get missed notes from if you are absent, etc. You're all in this together, help each other out. And, of course, there is always

me! Don't be afraid to come to me if you have questions or concerns. You can contact me via email or see me after class or during my office hour. My office hour is by appointment. I will also be at the tutoring center regularly and you can come and see me there.

Some class rules: Please silence your cell phones and don't use them when in class. Eating in class is NOT allowed. Drinking is permitted, as long as you remove your garbage afterwards.

Academic Integrity: Any act of academic dishonesty will be dealt with by applying the most stringent penalties permitted. Cheating includes, but is not limited to, receiving help during exams and submitting homework without properly acknowledging persons who assisted you. Please read carefully the Policy on Academic Integrity posted on the CUNY website with URL http://www1.cuny.edu/portal_ur/content/2004/policies/image/policy.pdf

I really don't like cheating. Please don't do it. There, I asked nicely.

Fall 2015 Academic Calendar

August

08/20/2015	Last day to apply for an e-Permit
08/26/2015	Last day of Registration
08/26/2015	**Last day to drop classes for 100% tuition refund**
08/27/2015	**CLASSES BEGIN**
08/27/2015 - 08/31/2015	Change of Program
08/29/2015	**FIRST DAY OF SATURDAY CLASSES**

September

09/01/2015 – 09/02/2015	Change of Program
09/02/2015	Last day to drop classes for 75% tuition refund.
09/02/2015	Last day for Change of Program
09/02/2015	Last day to add a class to an Existing Program
09/02/2015	Last day to submit request for Independent Study
09/02/2015	Last day to file for Pass/Fail and Audit Options
09/05/2015	**No Classes Scheduled**
09/07/2015	**Labor Day - College Closed**
09/09/2015	Last day to drop classes for 50% tuition refund
09/10/2015	**Classes follow a Monday Schedule**
09/13/2015 – 09/15/2015	**No classes scheduled (College Open)**
09/16/2015	Last day to drop classes for 25% tuition refund
09/16/2015	Last day to drop classes without the grade of "W"
09/16/2015	Last day to change or declare a major effective for Fall 2015; Form A census cutoff.
09/17/2015	**Course withdrawal period begins (A grade of "W" is assigned to students who officially drop a class) – No Refund**
09/17/2015	Freshman Convocation
09/18/2015	Verification of Enrollment begins
09/22/2015 – 09/23/2015	**No classes scheduled (College Open)**
09/25/2015	**Classes follow a Tuesday Schedule**
09/26/2015	Deadline for Verification of Enrollment due for Registrar to assign of "WN" grades
09/26/2015	Last day to submit proof of immunization for NYS residents

The City College of New York

October

10/12/2015	**Columbus Day - College Closed**
10/13/2015	Last day to submit proof of immunization for non-NYS residents

November

11/02/2015	Deadline for filing Application for Degree for February 2016 Graduation.
11/05/2015	INC grades for Spring 2015 and Summer 2015 for Undergraduates students convert to FIN
11/05/2015	INC grades for Summer 2014, Fall 2014 and for Graduate students convert to FIN
11/09/2015	Course withdrawal period ends. Last day to withdraw from a class with the grade of "W".
11/26/2015 – 11/29/2015	**College Closed – No Classes**

December

12/12/2015	**LAST DAY OF SATURDAY CLASSES**
12/14/2015	**LAST DAY OF CLASSES**
12/15/2015	Reading Day
12/16/2015 - 12/23/2015	**Final Exams**
12/23/2015	End of Fall Term
12/24/2015 - 12/25/2015	**College Closed**
12/30/2015	Last day for grade submissions - Fall 2015
12/31/2015	**College Closed**

January

01/01/2016	**College Closed**

Topics and Assignments:

#	Section/Topic	Assignment
1	5.1 Inverse Functions	1 – 43 odd, 46
2	5.2 The Natural Logarithm Function	1 – 43 odd, 51 – 65 odd, 73
3	5.3 The Natural Exponential Function	1 – 43 odd, 45(a), 49, 61 – 73 odd
4	5.4 General Logarithm and Exponential Functions	3 – 9 odd, 17, 21 – 39 odd, 41 – 45 odd
5	5.5 Exponential Growth and Decay (Omit compound interest)	1, 3, 7 – 17 odd
6	5.6 Inverse Trigonometric Functions	1 – 7 odd, 14, 17 – 33 odd, 39 – 47 odd
7	5.7 Hyperbolic Functions	1, 3, 17, 27, 29, 31, 35, 43, 47, 53, 55
8	5.8 Indeterminate Forms and L'Hôpital's Rule	1 – 37 odd, 43, 44
*	**Exam #1: on topics 1 through 8**	**Date TBA**
9	6.1 Integration by parts	1 – 29 odd, 35, 39
10	6.2 Trigonometric Integrals and Trig. Substitution	1 – 35 odd, 39 – 63 odd
11	6.3 Partial Fractions	1 – 41 odd
12	6.5 Approximate Integration (set-up and simplify, no calculators)	7 – 17 odd, 27, 31
13	6.6 Improper Integrals	1, 5 – 31 odd
*	**Exam #2: on topics 9 through 13**	**Date TBA**
14	7.1 Areas between Curves	1 – 19 odd, 21, 35, 36, 37
15	7.2 Volumes by Discs and Washers	1 – 17 odd, 27, 31, 33, 41, 43
16	7.3 Volumes by Cylindrical Shells	1 – 19 odd, 21a, 23a, 25a, 29 – 41 odd
17	7.4 Arc Length	1, 7 – 17 odd
18	7.6 Work (Omit Hydro pressure and force, moments and centers of mass)	1 – 17 odd, 18
*	**Exam #3: on topics 14 through 18**	**Date TBA**
19	9.1 Parametric Curves (omit graphing devices)	1 – 13 odd, 19, 21, 22
20	9.2 Calculus with Parametric Curves	1 – 15 odd, 33 – 39 odd
21	9.3 Polar Coordinates	1 – 39 odd, 46, 47 – 53 odd
22	9.4 Areas and Lengths in Polar Coordinates	1 – 11 odd, 15 – 35 odd
23	Handout – Conic sections	1 – 47 odd in the pdf file! (Not text)
24	Handout – Rotation of axes	5 – 11 odd, do part a and find the angle of rotation. In the pdf file! (Not text)
*	**Exam #4: on topics 19 through 24**	**Date TBA**
*	**Final Exam: Tuesday December 22, 6-8:15pm**	**Tentatively (our usual classroom)**

Your real first assignment is to email me, as in the "Contact" instructions above.

City College Department of Mathematics
Mathematics 20200 (Calculus II)

Prerequisite: I tcf g''qh'E''qt''j ki j gt''kp''O cyj ''423''qt''ku''gswkxcngpv'

Text: *Essential Calculus* '4ᵖᶠ ''gf kkqp''d{''Lco gu''Uvgy ctv.''4235.''Egpi ci g''Ngctpkpi ''

COURSE #: 20200 **COURSE TITLE:** Calculus II Á ÔŒĐ/ÒÕUÜŸKÅQ¢d[åˇ&¢¦^Á VÒÜTÁJØØÒÜÒÖKÅÒç^¦^Á^¦{ Á PUWÜÙÐÜÒÒQ\ÙKÁÍ Á@•Đ)\LÁHÁ&¦^åæÁ ÖŒĐ/ÒÁÒØØÒÔVŒÒKÅ€FBCFBÊ ÔUWÜÙÒÁÓUUUÜÖĐ OŒ/UÜKÅ€ŒÀT æå&@•^ÊÁ¢æ¦ÁGEFÍ Á	**CATALOG DESCRIPTION** Á Œ]]¦åææ¡}•Á -Á¡ç^*¦æa¡}Á ¢¦Á¿å^æ•Ãå)åÁ[¦{^•Á -Á^ç[¦ ¢¡}Ê Q,ç^*¦æa¡}Ác^&@ã ˇ^•ÊÁ Q,¢d[åˇ&¢¡}Áæ)åÁæ]]¦ååæ¡}Á -Á¡¢@ Á&æç˘•Á -Á ¦[*æåãõ@ •ÊÁ Q,]¦[]^¦Ãç^*¦æ•Áæ)åÁ§CP[]ãœç@ÁÜˇ|^ÊÁ Ú[|æ¦Á[[¦åã¢ æ^•ÊÁ Á

COURSE LEARNING OUTCOMES

The student is expected to acquire the skills which are presented in

the text and demonstrated by the instructor in class.   These skills include the following,

with associated departmental learning outcomes(see below):

1. use of integration to compute areas and volumes of revolution.   a,b

2. solution of work problems.   c

3. use of integration techniques to integrate.   a

4. use of the calculus of exponentials and logarithms.   a,b

5. definition and calculation of Improper integrals.   a, e1, e2.

6. use of L'Hospital's Rule.   a.

7. sketching and integration using polar coordinates.   a,b

COURSE ASSESSMENT TOOLS
Please describe below all assessment tools that are used in the course.
You may also indicate the percentage that each assessment contributes to the final grade.

1. 2 or 3 in-class tests and quizzes/homework, 60%

2. departmental final exam, 40%

DEPARTMENTAL LEARNING OUTCOMES *(to be filled out by departmental mentor)*

The mathematics department, in its varied courses, aims to teach students to

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a. perform numeric and symbolic computations
b. construct and apply symbolic and graphical representations of
functions
c. model real-life problems mathematically
d  use technology appropriately to analyze mathematical problems
e. state (e1) and apply (e2) mathematical definitions and theorems
f. prove fundamental theorems
g. construct and present (generally in writing, but, occasionally,
orally) a rigorous mathematical argument.
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Tgxkugf ''Hcm''4237.''Course Supervisor: A. Marchese

DERIVATIVES AND INTEGRALS

Basic Differentiation Rules

1. $\dfrac{d}{dx}[cu] = cu'$

2. $\dfrac{d}{dx}[u \pm v] = u' \pm v'$

3. $\dfrac{d}{dx}[uv] = uv' + vu'$

4. $\dfrac{d}{dx}\left[\dfrac{u}{v}\right] = \dfrac{vu' - uv'}{v^2}$

5. $\dfrac{d}{dx}[c] = 0$

6. $\dfrac{d}{dx}[u^n] = nu^{n-1}u'$

7. $\dfrac{d}{dx}[x] = 1$

8. $\dfrac{d}{dx}[|u|] = \dfrac{u}{|u|}(u'), \quad u \neq 0$

9. $\dfrac{d}{dx}[\ln u] = \dfrac{u'}{u}$

10. $\dfrac{d}{dx}[e^u] = e^u u'$

11. $\dfrac{d}{dx}[\log_a u] = \dfrac{u'}{(\ln a)u}$

12. $\dfrac{d}{dx}[a^u] = (\ln a)a^u u'$

13. $\dfrac{d}{dx}[\sin u] = (\cos u)u'$

14. $\dfrac{d}{dx}[\cos u] = -(\sin u)u'$

15. $\dfrac{d}{dx}[\tan u] = (\sec^2 u)u'$

16. $\dfrac{d}{dx}[\cot u] = -(\csc^2 u)u'$

17. $\dfrac{d}{dx}[\sec u] = (\sec u \tan u)u'$

18. $\dfrac{d}{dx}[\csc u] = -(\csc u \cot u)u'$

19. $\dfrac{d}{dx}[\arcsin u] = \dfrac{u'}{\sqrt{1 - u^2}}$

20. $\dfrac{d}{dx}[\arccos u] = \dfrac{-u'}{\sqrt{1 - u^2}}$

21. $\dfrac{d}{dx}[\arctan u] = \dfrac{u'}{1 + u^2}$

22. $\dfrac{d}{dx}[\text{arccot}\, u] = \dfrac{-u'}{1 + u^2}$

23. $\dfrac{d}{dx}[\text{arcsec}\, u] = \dfrac{u'}{|u|\sqrt{u^2 - 1}}$

24. $\dfrac{d}{dx}[\text{arccsc}\, u] = \dfrac{-u'}{|u|\sqrt{u^2 - 1}}$

25. $\dfrac{d}{dx}[\sinh u] = (\cosh u)u'$

26. $\dfrac{d}{dx}[\cosh u] = (\sinh u)u'$

27. $\dfrac{d}{dx}[\tanh u] = (\text{sech}^2 u)u'$

28. $\dfrac{d}{dx}[\coth u] = -(\text{csch}^2 u)u'$

29. $\dfrac{d}{dx}[\text{sech}\, u] = -(\text{sech}\, u \tanh u)u'$

30. $\dfrac{d}{dx}[\text{csch}\, u] = -(\text{csch}\, u \coth u)u'$

31. $\dfrac{d}{dx}[\sinh^{-1} u] = \dfrac{u'}{\sqrt{u^2 + 1}}$

32. $\dfrac{d}{dx}[\cosh^{-1} u] = \dfrac{u'}{\sqrt{u^2 - 1}}$

33. $\dfrac{d}{dx}[\tanh^{-1} u] = \dfrac{u'}{1 - u^2}$

34. $\dfrac{d}{dx}[\coth^{-1} u] = \dfrac{u'}{1 - u^2}$

35. $\dfrac{d}{dx}[\text{sech}^{-1} u] = \dfrac{-u'}{u\sqrt{1 - u^2}}$

36. $\dfrac{d}{dx}[\text{csch}^{-1} u] = \dfrac{-u'}{|u|\sqrt{1 + u^2}}$

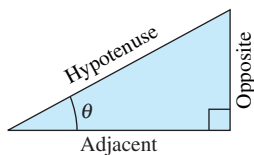## Basic Integration Formulas

1. $\displaystyle\int kf(u)\, du = k\int f(u)\, du$

2. $\displaystyle\int [f(u) \pm g(u)]\, du = \int f(u)\, du \pm \int g(u)\, du$

3. $\displaystyle\int du = u + C$

4. $\displaystyle\int a^u\, du = \left(\dfrac{1}{\ln a}\right)a^u + C$

5. $\displaystyle\int e^u\, du = e^u + C$

6. $\displaystyle\int \sin u\, du = -\cos u + C$

7. $\displaystyle\int \cos u\, du = \sin u + C$

8. $\displaystyle\int \tan u\, du = -\ln|\cos u| + C$

9. $\displaystyle\int \cot u\, du = \ln|\sin u| + C$

10. $\displaystyle\int \sec u\, du = \ln|\sec u + \tan u| + C$

11. $\displaystyle\int \csc u\, du = -\ln|\csc u + \cot u| + C$

12. $\displaystyle\int \sec^2 u\, du = \tan u + C$

13. $\displaystyle\int \csc^2 u\, du = -\cot u + C$

14. $\displaystyle\int \sec u \tan u\, du = \sec u + C$

15. $\displaystyle\int \csc u \cot u\, du = -\csc u + C$

16. $\displaystyle\int \dfrac{du}{\sqrt{a^2 - u^2}} = \arcsin \dfrac{u}{a} + C$

17. $\displaystyle\int \dfrac{du}{a^2 + u^2} = \dfrac{1}{a}\arctan \dfrac{u}{a} + C$

18. $\displaystyle\int \dfrac{du}{u\sqrt{u^2 - a^2}} = \dfrac{1}{a}\text{arcsec} \dfrac{|u|}{a} + C$
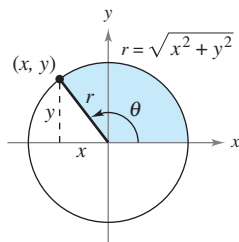
TRIGONOMETRY

Definition of the Six Trigonometric Functions
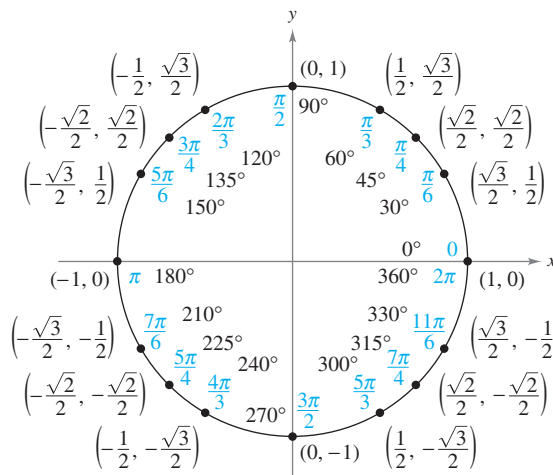
Right triangle definitions, where $0 < \theta < \pi/2$.

$$\sin \theta = \frac{\text{opp}}{\text{hyp}} \qquad \csc \theta = \frac{\text{hyp}}{\text{opp}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}} \qquad \sec \theta = \frac{\text{hyp}}{\text{adj}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}} \qquad \cot \theta = \frac{\text{adj}}{\text{opp}}$$

Circular function definitions, where θ is any angle.

$$\sin \theta = \frac{y}{r} \qquad \csc \theta = \frac{r}{y}$$

$$\cos \theta = \frac{x}{r} \qquad \sec \theta = \frac{r}{x}$$

$$\tan \theta = \frac{y}{x} \qquad \cot \theta = \frac{x}{y}$$

Reciprocal Identities

$$\sin x = \frac{1}{\csc x} \qquad \sec x = \frac{1}{\cos x} \qquad \tan x = \frac{1}{\cot x}$$

$$\csc x = \frac{1}{\sin x} \qquad \cos x = \frac{1}{\sec x} \qquad \cot x = \frac{1}{\tan x}$$

Tangent and Cotangent Identities

$$\tan x = \frac{\sin x}{\cos x} \qquad \cot x = \frac{\cos x}{\sin x}$$

Pythagorean Identities

$$\sin^2 x + \cos^2 x = 1$$

$$1 + \tan^2 x = \sec^2 x \qquad 1 + \cot^2 x = \csc^2 x$$

Cofunction Identities

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

$$\csc\left(\frac{\pi}{2} - x\right) = \sec x \qquad \tan\left(\frac{\pi}{2} - x\right) = \cot x$$

$$\sec\left(\frac{\pi}{2} - x\right) = \csc x \qquad \cot\left(\frac{\pi}{2} - x\right) = \tan x$$

Reduction Formulas

$$\sin(-x) = -\sin x \qquad \cos(-x) = \cos x$$

$$\csc(-x) = -\csc x \qquad \tan(-x) = -\tan x$$

$$\sec(-x) = \sec x \qquad \cot(-x) = -\cot x$$

Sum and Difference Formulas

$$\sin(u \pm v) = \sin u \cos v \pm \cos u \sin v$$

$$\cos(u \pm v) = \cos u \cos v \mp \sin u \sin v$$

$$\tan(u \pm v) = \frac{\tan u \pm \tan v}{1 \mp \tan u \tan v}$$

Double-Angle Formulas

$$\sin 2u = 2 \sin u \cos u$$

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

$$\tan 2u = \frac{2 \tan u}{1 - \tan^2 u}$$

Power-Reducing Formulas

$$\sin^2 u = \frac{1 - \cos 2u}{2}$$

$$\cos^2 u = \frac{1 + \cos 2u}{2}$$

$$\tan^2 u = \frac{1 - \cos 2u}{1 + \cos 2u}$$

Sum-to-Product Formulas

$$\sin u + \sin v = 2 \sin\left(\frac{u + v}{2}\right) \cos\left(\frac{u - v}{2}\right)$$

$$\sin u - \sin v = 2 \cos\left(\frac{u + v}{2}\right) \sin\left(\frac{u - v}{2}\right)$$

$$\cos u + \cos v = 2 \cos\left(\frac{u + v}{2}\right) \cos\left(\frac{u - v}{2}\right)$$

$$\cos u - \cos v = -2 \sin\left(\frac{u + v}{2}\right) \sin\left(\frac{u - v}{2}\right)$$

Product-to-Sum Formulas

$$\sin u \sin v = \frac{1}{2}[\cos(u - v) - \cos(u + v)]$$

$$\cos u \cos v = \frac{1}{2}[\cos(u - v) + \cos(u + v)]$$

$$\sin u \cos v = \frac{1}{2}[\sin(u + v) + \sin(u - v)]$$

$$\cos u \sin v = \frac{1}{2}[\sin(u + v) - \sin(u - v)]$$

Questionnaire

What is your major? _____

Are you sure you need this class? _____ (think about it again, and answer).

What is the highest level of math you have to complete for your major? _____

How did you get into this class? (Passed the prerequisite course, placed here upon college entry, placed by an advisor, etc)

_____

_____

Are there any dates during the Fall for which you will not be able to take an exam/quiz due to religious reasons? If so, please state the date(s) and "occasion(s)" below.

_____

_____

How good would you say you are at Algebra? _____ Precalc? _____ Calc 1? _____
(Enter 5 for "I can do it in my sleep!", 4 for "I'm not the best at it, but pretty awesome.", 3 for "I'm just OK; I'm good at the basics.", 2 for "I'm not the worst, but far from the best.", 1 for "The class was a blur that got more obscure over time!")

With the same scale as above, rate your comfort level with math: _____

Any general feelings or concerns towards this course? (For example, are you: Scared? Excited? Curious? Indifferent? Based on your perceived ability in math, what grade are you expecting? etc)

_____

_____

_____

Are there any other relevant comments that you wish to add?

_____

_____