Math 1432

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http://www.math.uh.edu/~almus

Visit CASA regularly for announcements and course material. Due dates and announcements will be posted on the calendar at CASA.

Read the syllabus posted on the course website.

If you email me, please mention the course (1432) in the subject line.

Office: 212 PGH

Office Hours:

Monday: 10-10:40 a.m., 12-12:30pm
Wednesday: 10-10:40 a.m., 12-12:30pm
Friday: 10-10:40 a.m., 12-1pm.
Math 1432 – OVERVIEW

Please read the syllabus. If you have any questions, you can email me or come to my office hours.

Let’s go over some of the items on the syllabus:

**Major Assignments/Exams**

**ASSESSMENTS**

- Test 1 - 5%
- Tests 2, 3, 4 - 15% each
- Final exam - 25%

Lab Quizzes – 5%

Homework (written and EMCF) – 7%

Online Quizzes - 10%

In-class Poppers and Attendance - 3%

Exams:

- Test 1 is online; covers Calculus 1. 2 attempts. Take practice test 1 first (20 attempts) to see what to expect on Test 1. Under online assignments tab at CASA.
- Tests 2, 3, 4 and final are at CASA by reservation. Check the syllabus for dates.
- Practice tests are extra credit; I strongly recommend to take them!
- No make ups on any exams.
- **No calculators**; study accordingly.
Online Quizzes

- Under online assignments tab at CASA
- 20 attempts.
- No make ups
- Will not reopen.
- Check the due dates from the calendar on CASA.
- Work on them before the due date so that you can get help and retake to improve your score.

Written HW

- Posted on CASA. Print it out and solve the problems on that paper.
- Due in lab on the due date.
- Covers the previous 3-4 lectures’ material.

Poppers

- For attendance; starts 3rd week of school.
- Get scantrons from UH Bookstore; should have your section number on it.

Lab Quiz:

- Very important to take every quiz!
- Given in lab on Fridays.
- Will prepare you for the free response portion of the exams.
- Will cover previous 3-4 lectures’ material.
LAB / Recitations:

- Attend the LAB that you’re enrolled in.
- Know your TA’s name and email.
- **Lab quiz** every Friday starting 2nd week.
- Written HW will be turned in during lab on the due date indicated at CASA.
- Attendance will be taken at every lab.
- If you have any issues about the lab or TA, please let me know.

NEED HELP?

- You can come and see me during my office hours.
- You can ask your questions in lab.
- You can go to CASA tutoring center (2nd floor of Garrison Gym).
- LAUNCH provides walk in tutoring; students really like their services.
- You might consider enrolling in an SEP workshop (one credit).
- Check out the help videos I posted on CASA….

**IF YOU NEED HELP; GET HELP!!!!**
CLASSROOM BEHAVIOR

- **RESPECT** your friends. Please stay away from any distracting behavior (talking, watching videos, playing games, etc.).
- **COME IN WITH A POSITIVE ATTITUDE!** Calculus is FUN and you can do it!
- Come prepared; make sure you understand previous lectures’ material before coming in to the class.
- Print Blank notes and bring to class. Keep an organized binder. You will see that this will benefit you.
- If you have any questions during the lecture, do not hesitate to ask.
- After class, make sure you understand that day’s material. Solve the problems that are left as exercises, and start working on homework problems and online quiz.
- If you have questions after class, come and see me.

TO DO LIST:

- Need to purchase access code from UH Bookstore to have continuing access to CASA. Free access for the first 2 weeks.
- Need to purchase a package of popper scantrons with your section number on it.
- First online assignments: Practice test 1, Test 1, and quiz 1. Click on online assignments tab at CASA.
- Try to attend every lecture and lab.
READY FOR CALCULUS 2?

Chapter 7 APPLICATIONS OF INTEGRALS

Section 7.1 - Integration Review

You can visit my website for “Calculus 1 – online” to go over subjects covered in Calculus 1. Notes and videos are posted there; the link is available at CASA. I assume you know Chapter 6 very well!
## TABLE OF INTEGRALS

\[
\begin{align*}
\int x^r \, dx &= \frac{x^{r+1}}{r+1} + C ; \ r \neq -1 \\
\int \frac{1}{x} \, dx &= \ln|x| + C \\
\int \sin x \, dx &= -\cos x + C \\
\int \cos x \, dx &= \sin x + C \\
\int \sec^2 x \, dx &= \tan x + C \\
\int \csc^2 x \, dx &= -\cot x + C \\
\int \sec x \tan x \, dx &= \sec x + C \\
\int \csc x \cot x \, dx &= -\csc x + C \\
\int e^x \, dx &= e^x + C \\
\int a^x \, dx &= \frac{a^x}{\ln a} + C ; \ a > 0, \ a \neq 1. \\
\int \frac{1}{\sqrt{1-x^2}} \, dx &= \arcsin x + C \\
\int \frac{1}{1+x^2} \, dx &= \arctan x + C \\
\int \frac{1}{\sqrt{a^2-u^2}} \, du &= \arcsin \left( \frac{u}{a} \right) + C \\
\int \frac{1}{a^2+u^2} \, dx &= \frac{1}{a} \arctan \left( \frac{u}{a} \right) + C
\end{align*}
\]

The last two formulas with u-sub:
From Section 6.4 of textbook:

<table>
<thead>
<tr>
<th>TABLE OF INTEGRALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ \int u^n , du = \frac{u^{n+1}}{n+1} + C, \text{ for } n \neq -1. ]</td>
</tr>
<tr>
<td>[ \int \frac{1}{u} , du = \ln</td>
</tr>
<tr>
<td>[ \int \tan x , dx = -\ln</td>
</tr>
<tr>
<td>[ \int \sec x , dx = \ln</td>
</tr>
<tr>
<td>[ \int \frac{1}{\sqrt{a^2 - x^2}} , dx = \arcsin\left(\frac{x}{a}\right) + C ]</td>
</tr>
<tr>
<td>[ \int \frac{1}{a^2 + x^2} , dx = \frac{1}{a} \arctan\left(\frac{x}{a}\right) + C ]</td>
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</tbody>
</table>
Example 1: \[ \int \frac{x}{\sqrt{9-x^2}} \, dx = \int \frac{1}{\sqrt{u}} \cdot \frac{du}{-2} = -\frac{1}{2} \int u^{-\frac{1}{2}} \, du \]

Let \( u = 9 - x^2 \)

\( du = -2x \, dx \)

\[ = -\frac{1}{2} \cdot \frac{u^{\frac{1}{2}}}{\frac{1}{2}} + C \]

\[ = -\sqrt{9-x^2} + C \]

Example 2: \[ \int \frac{2}{\sqrt{9-x^2}} \, dx = 2 \int \frac{1}{\sqrt{9-x^2}} \, dx \]

\[ = 2 \cdot \arcsin \left( \frac{x}{3} \right) + C \]
Example 3: \[ \int \frac{x+1}{64+x^2} \, dx = \int \frac{x}{6u+u^2} \, du + \int \frac{1}{6u+u^2} \, du \]

\[ u = 64 + x^2 \]
\[ du = 2x \, dx \]

\[ = \int \frac{1}{u} \cdot \frac{du}{2} + \frac{1}{8} \arctan \left( \frac{x}{8} \right) + C \]
\[ \int e^{ax} \, dx = \frac{1}{a} e^{ax} + C \]

Example 4: \[ \int \frac{2 - e^x}{e^{2x}} \, dx = \int \frac{2}{e^{2x}} - \frac{e^x}{e^{2x}} \, dx \]

\[ = \int 2e^{-2x} \, dx - \int e^{-x} \, dx \]

\[ = 2 \cdot \frac{e^{-2x}}{-2} - \frac{e^{-x}}{-1} + C \]

\[ = -e^{-2x} + e^{-x} + C \]

Example 5: \[ \int \cos x \sqrt{1 + \sin x} \, dx = \int \sqrt{u} \cdot du \]

\[ u = 1 + \sin x \]

\[ du = \cos x \, dx \]

\[ = \frac{1}{2} + 1 \]

\[ = \frac{u}{\sqrt{u} + 1} + C \]

\[ = \frac{2}{3} \cdot u^{3/2} + C \]

\[ = \frac{2}{3} (1 + \sin x)^{3/2} + C \]
Example 6: \[
\int \frac{\sqrt{x+5}}{\sqrt{x+1}} \, dx = \int \frac{u+4}{\sqrt{u}} \, du = \int \frac{u}{\sqrt{u}} + \frac{4}{\sqrt{u}} \, dx
\]

Let \( u = \sqrt{x+1} \Rightarrow x = u^2 - 1 \Rightarrow u = u-1+5 = u+4 \)

\[du = dx\]

\[= \int \sqrt{u} \, du + \int 4 \cdot u^{-\frac{1}{2}} \, du\]

\[= \frac{u^{\frac{3}{2}}}{\frac{3}{2}} + 4 \cdot \frac{u^{\frac{1}{2}}}{\frac{1}{2}} + C = \frac{2}{3} (u+1)^{\frac{3}{2}} + 8 (u+1)^{\frac{1}{2}} + C\]

\[= \frac{2}{3} (\sqrt{x+1}+1)^{\frac{3}{2}} + 8 (\sqrt{x+1}+1)^{\frac{1}{2}} + C\]

\[= \int_a^b f(x) \, dx = \left[ F(x) \right]_a^b = F(b) - F(a)\]
Example 7: \[ \int_{0}^{4} \frac{x}{x^2 + 4} \, dx = \int_{u=0}^{u=4} \frac{1}{u} \cdot \frac{du}{2} = \left[ \frac{1}{2} \ln |u| \right]_{4}^{5} \]

\[ u = x^2 + 4 \Rightarrow x = 0 \Rightarrow u = 0^2 + 4 = 4 \]

\[ du = 2x \, dx \Rightarrow x = 1 \Rightarrow u = 1^2 + 4 = 5 \]

\[ = \frac{1}{2} \ln 5 - \frac{1}{2} \ln 4 \]
Homework: Read section 7.1 from your text book.

To see more examples, click on the “Integration Review” link on CASA and check the videos there. You can also visit my summer Calculus 1 website (link posted on CASA).

Check course website regularly for announcements.

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Take practice test 1 and test 1 SOON!

Topics:
• Limits
• Continuity
• Definition of derivatives
• Derivatives
• Mean Value Theorem
• Inverse functions and their derivatives
• Implicit differentiation
• Related rate word problems
• Optimization word problems
• Graphs of derivatives
• Extreme values and concavity
• Integration