Math 1432
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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.

Chapter 7
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**

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

The last two formulas with u-sub:

\[
\begin{align*}
\int \frac{1}{\sqrt{a^2-u^2}} \, du &= \arcsin \left( \frac{u}{a} \right) + C \\
\int \frac{1}{a^2+u^2} \, dx &= \frac{1}{a} \arctan \left( \frac{u}{a} \right) + C
\end{align*}
\]
From Section 6.4 of textbook:

\[
\begin{align*}
\int u^n \, du &= \frac{u^{n+1}}{n+1} + C, \text{ for } n \neq -1. \\
\int \frac{1}{u} \, du &= \ln|u| + C \quad \text{and} \quad \int \frac{g'(x)}{g(x)} \, dx = \ln|g(x)| + C \\
\int \tan x \, dx &= -\ln|\cos x| + C = \ln|\sec x| + C \\
\int \sec x \, dx &= \ln|\sec x + \tan x| + C \\
\int \frac{1}{\sqrt{a^2 - x^2}} \, dx &= \arcsin \left( \frac{x}{a} \right) + C \\
\int \frac{1}{a^2 + x^2} \, dx &= \frac{1}{a} \arctan \left( \frac{x}{a} \right) + C \\
\int \frac{1}{a^2 - u^2} \, du &= \arcsin \left( \frac{u}{a} \right) + C \\
\int \frac{1}{a^2 + u^2} \, du &= \frac{1}{a} \arctan \left( \frac{u}{a} \right) + C
\end{align*}
\]
Example 1: $\int \frac{x}{\sqrt{9-x^2}} \, dx =$

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

Example 3: $\int \frac{x+1}{64+x^2} \, dx =$
Example 4: \( \int \frac{2 - e^x}{e^{2x}} \, dx = \)

Example 5: \( \int \cos x \sqrt{1 + \sin x} \, dx = \)
Example 6: \( \int \frac{x+5}{\sqrt{x+1}} \, dx = \)

Example 7: \( \int_{0}^{1} \frac{x}{x^2 + 4} \, dx = \)
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.

www.math.uh.edu/~almus

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