

Week 14

Fri: Take-Home Due

= Presentations: (alphabetical*)

Tue: Final 10 am (guide posted this p.m.)
Exam 1, 2, 3 + Exact Exam 4
very similar

Grades:

pass the final? $\Rightarrow$ pass the course

Mon, Wed, Thur = Review

Course Eval (Educat link)

Overview

Exam 1

Integration

- u-sub
- int. by parts
- partial fractions

Exam 2

trig Integrals
trig sub.

Exam 3

Sequences + Series

Taylor:

$$f(x) = \sum_{n=0}^{\infty} \frac{f^{(n)}(a)}{n!} (x-a)^n$$

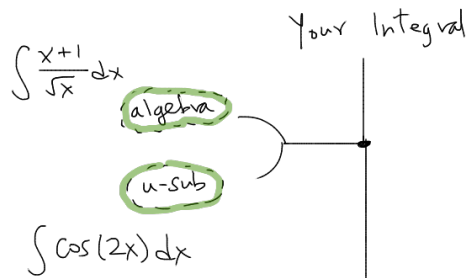
Maclaurin: $a=0$ $\uparrow$

Exam 4

Polar Coord.
Parametriz Curves
Differential Equ

Integration Techniques

Tools: u-sub, I.B.P., ^{*(multi times)} partial fractions, trig int, trig sub
 $\int \sqrt{1-x^2} dx$
 $\int \cos^3(x) dx$



I.B.P. $uv - \int v du$

what should u be?

• LIPET

• products: $\int e^x \cos x dx$

• inverse trig: $\int \sin^{-1} x dx$

- log $\int \log x dx$

ⓧ everything gets used

$$\int \sin^{-1} x dx \quad u = \sin^{-1} x \quad dv = dx$$

$$uv - \int v du$$

$$= \sin^{-1} x \cdot x - \int (1-x^2)^{-1/2} x dx$$

$$x \cdot \sin^{-1} x \quad u = 1-x^2 \quad du = -2x dx$$

$$\frac{1}{-2x} du = dx$$

$$= x \cdot \sin^{-1} x - \left(-\frac{1}{2}\right) \int u^{-1/2} du$$

$$= x \sin^{-1} x + \sqrt{1-x^2} + C$$

ⓧ $\int e^x \cos x dx$

$$u = e^x \quad dv = \cos x dx$$

$$du = e^x dx \quad v = \sin x$$

$$= e^x \sin x - \int e^x \sin x dx$$

$$u = e^x \quad dv = \sin x dx$$

$$du = e^x dx \quad v = -\cos x$$

$$\int e^x \cos x dx = e^x \sin x - \left[-e^x \cos x - \int e^x \cos x dx \right]$$

$$= e^x \sin x + e^x \cos x - \int e^x \cos x dx$$

add.

$$\int e^x \cos x dx = \frac{1}{2} e^x (\sin x + \cos x) + C$$