C01: LogExpDerInt.

Find $\frac{d}{dx}[\ln(3e^x)]$.

S01: LogExpPrf.

Use $\frac{d}{dx}[\ln(x)] = \frac{1}{x}$, $\ln(1) = 0$, and $\ln(e) = 1$ to prove that $\ln(ex) = \ln(x) + 1$.

C02: HypDerInt.

Find $\frac{d}{dx}[x\cosh(3x)]$.

S02: HypPrf.

Use the definitions

$$\sinh(x) = \frac{e^x - e^{-x}}{2} \qquad \cosh(x) = \frac{e^x + e^{-x}}{2}$$

to prove that $\frac{1}{2}\sinh(2x) = \sinh(x)\cosh(x)$.

C03: IntSub.

Find $\int x(x+4)^5\,dx$.

S03: TrigId.

Find $\int \cos^4(\theta)\sin^3(\theta)\,d\theta$.

S04: TrigSub.

Find $\int \frac{1}{\sqrt{4-x^2}}\,dx$.

S05: PartFrac.

Expand $\dfrac{x^2+2}{x^3+x}$ using partial fractions. Do not integrate.

C04: IntParts.

Find $\int 4x^2\sin(2x)\,dx$.

C05: IntTech.

Which integration technique is most appropriate for each integral?

1. $\int \sin^4(x)\cos^3(x)\,dx$
2. $\int \frac{x^3+4x-1}{(x+4)(x^2+5)^2}\,dx$
3. $\int 6x^2\sqrt{1+x^3}\,dx$
4. $\int \sin(2x)e^x\,dx$
5. $\int \frac{4}{x^2\sqrt{x^2-1}}\,dx$ where $x > 1$

- Integration by Substiution
- Method of Partial Fractions
- Trigonometric Identities
- Trigonometric Substitution
- Integration by Parts

C06: AreaBtCurv.

Find a definite integral equal to the area bounded by $y = 4 - x^2$ and $y = x^2 + 4$.

S06: CrossSect.

Find a definite integral equal to the volume of a pyramid of height 6 that has a square base of side length 3.

C07: WashShell.

Find a definite integral equal to the volume of the solid obtained by rotating the region bounded by $y = x$, $y = 2x$, $y = 4$ around the axis $y = -1$.

S07: WorkDiff.

Assume salt water weighs $10kN/m^3$. Find an expression in terms of y for the work differential dW required to pump a cross-section of water at height y from a rectangular tank that stands 4 meters tall, with a 3×5 meter base. Then give a definite integral equal to the work required to pump this tank if it filled 2 meters deep with salt water.

C13: SerTech.

For each series, choose **one** technique that would be appropriate to determine convergence/divergence. (There may be multiple correct responses.) Then choose whether the series is convergent or divergent. You do not need to show your work.
Choices: *Partial Sum Sequence — Divergence Test — Geometric Series Test — Alternating Series Test — Integral Test — p-Series Test — Ratio Test — Root Test — Direct/Limit Comparison Test*

1. $\sum_{k=0}^{\infty} \frac{3}{k^{1.1}}$
2. $\sum_{m=3}^{\infty} \frac{m^2}{m^3+1}$
3. $\sum_{n=2}^{\infty} 7^{3-n}$

C14: PowSer.

Find the domain of $f(x) = \sum_{k=1}^{\infty} \frac{kx^k}{3^k}$. For each endpoint, if they exist, write the appropriate series and label it as converges/diverges, but you do not need to show your work in determining if the series converges or diverges.

C15: TaySer.

Generate the Taylor series where $a = 1$ for $f(x) = \frac{1}{x}$.

S15: PowSerConv.

Use the fact that $e^x = \sum_{k=0}^{\infty} \frac{x^k}{k!}$ for all real numbers x to find a power series converging to $f(x) = 2e^{-x}$ for all real numbers x.

MA 126-103 — Summer 2017 — Dr. Clontz — 2017 July 24 Quiz

Name:	Exercise Type (Cost):
J#:	**In-Class (1AP each)**
Date: **2017 July 24**	

Write the Standard code (C## or S##) for the exercise you are attempting:	Mark:
⋆ reattempt due on:	