

## CALCULUS 2: FINAL REVIEW SHEET

Be able to take all previous tests without error

- **Section 0.6.2 Integration by Parts**
  - Choose u by LIATE!
  - [Integration by Parts Worksheet](#)
- **Section 1.3 Applications of Integration in Engineering and Physics**
  - Spring Problems (Know Hooke's Law and how to find Work) [Spring Worksheet](#)
  - [Hydrostatic Force Worksheet](#)
  - Work to pump fluid from a tank (See examples from in class, recitation, Chapter 1 p. 43-44 #5-7, and [Work Emptying a Tank Worksheet](#) )
- **Section 2.1 Trigonometric Integrals**
  - Be able to do problems with sine and cosine, tangent and secant
  - Ex 1-5, 7,8,12, 13
- **Section 2.2 Trigonometric Substitution**
  - I'll give you what x is equal to (ex. Hint:  $x=2\sec(\theta)$ )
  - Ex 1,3,4,7,8,13
  - [Trig Substitution worksheet](#)
- **Section 2.3 Partial Fractions**
  - Look at the [Partial Fractions worksheet](#)
  - Be able to handle all the cases
  - Ex 1-7,11,14
- **Section 2.5 Numerical Integration**
  - Know both the Trapezoidal Rule and Simpson's Rule
  - Know how to use the formulas for error bounds
  - Ex 1,7,9,11,13
- **Section 2.6 Improper Integrals**
  - Be able to determine whether an improper interval is convergent or divergent
  - Ex 2-5, 7, 8, 9,14
- **3.1 Intro to Differential Equations**
  - Be able to determine if a function is a solution to a differential equation
  - Examples p. 20 #1,3
- **3.2 Separable Equations**
  - Be able to do problems with Separable equations
  - [Separable Equations WS](#)

- **3.3 Applications of Separable Equations**
  - Be able to do mixing problems, exponential growth and decay, the logistic model
  - [Mixing Problems](#)
  - Examples p. 51 #1,4 ,6,7,14
- **3.4 Second-Order Linear Homogeneous Differential Equations**
  - Know how to find solutions to the auxiliary equation of  $ay''+by'+cy=0$  for all 3 cases.
  - Be able to solve initial and boundary value problems.
  - Examples p.71 #1-13 odd
- **3.5 Second-Order Linear Nonhomogeneous Differential Equations**
  - Be able to find the complementary solution
  - Find the particular solution using the Method of Undetermined Coefficients
  - Use the complementary and particular to find the general solution
  - know what to do if the complementary and the particular overlap
  - [2<sup>nd</sup> Order WS](#)
  - Examples p.81 #1, 3, 6, 13, 16
- **3.6 Applications of Second-Order Differential Equations**
  - Spring Problems:  $mx''+bx'+kx=0$  (know the different types of damping)
  - $mx''+bx'+kx=F\cos t$
  - p. 101 # 1,3, and [Spring worksheet](#)
- **4.1 Sequences**
  - Examples p. 20 # 1,35,7,11,12,13
- **4.2 Infinite Series**
  - Be able to determine if a given series is convergent
  - Know when a geometric series is convergent and what it converges to
  - Know about the Harmonic Series
  - Know the Test for Divergence
  - Examples p. 32 #1,3,5, 7,9,12,13,14
  - [Sequences and Series Worksheet](#)
- **4.3 Convergence Tests**
  - Know when the Integral test, Comparison Test, Limit Comparison test can be applied.
  - Know when a p-series converges and when it diverges
  - Examples: p. 47 #1,2,3,5,9,10,11
  - [Comparison Test Worksheet](#)
  - [Limit Comparison Test Worksheet](#)
  - [Integral Test Worksheet](#)
- **4.4 Alternating Series Test**
  - Know the Alternating Series Test
  - Know the Alternating Series Estimation Theorem p. 51

-Examples: p. 53 # 1,3,4,13

- **4.5 Absolute Convergence and the Ratio Test**

- Know the Ratio test

- Understand when a series converges, conditionally converges, absolutely converges, diverges

- p. 60 # 1,3,9,11

- **4.6 Power Series**

- Be able to find the radius and interval of convergence for a given Power Series & be able to justify your work

- Examples: p. 67 # 5,6,7,9

- [Power Series](#)

- **4.7 Functions as Power Series**

- Understand how to use the Geometric series to represent a Power series

- Examples: p. 76 # 1,3,4,7,11,13

- **4.8 Taylor and Maclaurin Series**

- Know the difference between a Taylor and Maclaurin series. Be able to derive Taylor and Maclaurin series as well as find related Taylor series using known series (ex Derive Maclaurin for  $\exp(x)$ , use that to ...)

- Examples: p 91 # 1,3,4,5,10,12 [Taylor and Maclaurin Series](#)

- Binomial Series: p. 91: #14,16,17 [Binomial Series](#)

- **4.9 Taylor Polynomials**

- Be able to find Taylor Polynomials and use Taylor's Inequality. I will give you the formula for Taylor's Inequality

- Be able to use a Taylor polynomial to approximate different values

- Examples: p. 102: #3,5,9,11 [Taylor Polynomials](#)