Test #1 Material

1 – Course Introduction
   5.7 Review Additional Integration Techniques (Trig Integrals)
2 – 5.7 Review Additional Integration Techniques (Trig Integrals cont., Partial Fractions)
3 – 5.7 Review Additional Integration Techniques (Partial Fractions cont, Trig Substitution)
   5.8 Table of Integrals
4 – 5.7 Review Additional Integration Techniques (Long Division)
   5.9 Approximate Integration (Trapezoidal Rule, Simpson’s Rule)
5 – 5.9 Approximate Integration (Simpson’s Rule Cont, Error Bound)
6 – 5.10 Improper Integrals (Infinite Intervals)
7 – 5.10 Improper Integrals (Discontinuous Integrands, Comparison Theorem)
8 – 6.1 More about Areas (Area between curves, Area enclosed by Parametric Curves)
9 – General Method used in all of Chapter 6.
   6.1 More about Areas (Area enclosed by Parametric Curves cont)
   6.2 Volumes (Solids of Revolution)
10 – 6.2 Volumes (Solids of Revolution review, Cylindrical Shells)
    Revolution not around the axis.
11 – 6.3 Arc Length
12 – 6.3 Arc Length cont. (problem)
    6.4 Average Value of a Function
    Mean Value Theorem for Integrals
13 – Review for Test #1
14 – Review for Test #1 Cont.
Test #1

Test #2 Material

15 – 6.5 Applications to Physics and Engineering
   Work Problem Procedure
   Hooke's Law
   Spring Problem
   Pumping Problem

16 – 6.5 Applications to Physics and Engineering (cont)
   Pumping Water Problem (cont)
   Spring Problem
   Cable Problem
   Pressure Problem Procedure
   Pressure Problem
   Pumping Problem

17 – 6.5 Applications to Physics and Engineering (cont)
   Pumping Problem (cont)
   Pressure Problems (3)

18 – 6.5 Applications to Physics and Engineering (cont)
   Moments and Centers of Mass

19 – 7.1 Modeling with Differential Equations

20 – 7.2 Direction Fields and Euler’s Method

21 – 7.2 Direction Fields and Euler’s Method (cont)
   7.3 Separable Differential Equations

22 – 7.3 Separable Differential Equations (cont)
   Orthogonal Trajectories

23 – 7.3 Separable Differential Equations (cont)
   Tank Problems
24 – Tank Problem
  7.4 Exponential Growth and Decay
  Carbon–14
25 – 7.4 Exponential Growth and Decay
  Compound Interest
  Newton’s Law of Cooling
26 – 7.5 The Logistic Equation
27 – 7.5 The Logistic Equation
  Test #2 Review
28 – Test #2 Review

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Test #2

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Test #3 Material
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29 – 7.7 2nd Order Linear Differential Equations
  Terms Auxiliary equation (Characteristic Equation)
  Method
  Both roots of auxiliary equation are real and distinct
  Both roots of auxiliary equation are real and equal
30 – 7.7 2nd Order Linear Differential Equations (cont)
  Both roots of auxiliary equation are complex
31 – 7.7 2nd Order Linear Differential Equations (cont)
  Review of 7.7
  Several Problems
32 – 7.8 Nonhomogeneous Linear Equations
  Method
  Exponential Problems(2)
  Sin or Cos Problem
33 – 7.8 Nonhomogeneous Linear Equations (cont)
   Sin or Cos Problem
   Polynomial Problem
   Combined Problem
34 – 7.9 Applications of 2nd Order Differential Equations
   Some additional 7.7 and 7.8 problems
   Oscillatory phase shift and amplitude
35 – 7.9 Applications of 2nd Order Differential Equations (cont)
   Spring – over damping, critical damping, under damping
   Spring Problems (2)
36 – 7.9 Applications of 2nd Order Differential Equations (cont)
   Circuit Problem
37 – 8.1 Sequences
   Convergence and Divergence
   Alternating signs
   Fibonacci sequence
   Geometric Progression
38 – 8.2 Series
   Geometric Progression Convergence and Value
39 – 8.2 Series (Cont.)
   Derivation and Integration
   Telescoping
   Harmonic
   Divergence Test
   Convergence Rules
40 – 8.3 Convergence Tests
   Integral Test
   Power series
41 – 8.3 Convergence Tests (Cont)
Comparison Test
Limit Comparison Test
Error Estimate

42 – 8.3 Convergence Tests (Cont)
Error Estimate (Cont)

43 – Test #3 Review

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Test #3

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Test #4 Material

44 – 8.4 Other Convergence Tests
Alternating Series Test
Alternating Series Estimation

45 – 8.4 Other Convergence Tests (cont)
Alternating Series Test (Problems)
Absolute Convergence
Ratio Test

46 – 8.5 Power Series
Interval of Convergence
Bessel Function

47 – Test #3 Results
Bessel Function Review
3 Power Series Problems

48 – 8.6 Representations of Functions as Power Series
Converting a Function into a Power Series
Differentiating a Power Series
Integrating a Power Series

49 – 8.6 Representations of Functions as Power Series (cont)
Differentiating and Integrating a Power Series (cont)

50 – 8.7 Taylor and MacLaurin Series

51 – 8.7 Taylor and MacLaurin Series (cont)

Exponential Taylor Series
Taylor Polynomial
Sine Taylor Series
Derivative of Taylor Series

52 – 8.7 Taylor and MacLaurin Series (cont)

Review of Taylor Series
Cosine Taylor Series
Arithmetic Computations on Taylor Series

53 – 8.7 Taylor and MacLaurin Series (cont)

Problem (cont)
Error Estimate
Product of a Taylor Series

54 – 8.8 Binomial Series

Binomial Series Derivation

55 – 8.8 Binomial Series (cont)

Binomial Series Problem

56 – 8.8 Binomial Series (cont)

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Test #4

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57 – 8.9 Application of Taylor McLaurin Series

58 – 8.9 Application of Taylor McLaurin Series (cont)

Test#4 Review

59 – Final Review