

Text: *Differential Equations with Boundary Value Problems*, 7th ed., by Dennis G. Zill and Michael R. Cullen. Some quizzes and hour exams may require use of the USNA Mathematical Tables in lieu of a calculator. Your instructor will determine this.

LESSON/PAGES

SECTION/TOPIC

PROBLEMS

2-10

1.1 Introduction to differential equations

p. 10: 1,2,13,19,27,29

13-16

1.2 Initial value problems

p. 17: 1,9,13,14,17,25,26

44-50; 53-58

2.2 Separable variables; 2.3 Linear equations

p. 50: 1,6,7,17,25; p.60: 3,5,10,23,27,28

35-37, 75-79

2.1.1 Direction fields; 2.6 Euler's method

p. 41: 1,3; p.79: 1,2

85-87

3.1 Applications of linear models: Cooling and mixing

p. 89: 13,17,21,25

Review

118-120

4.1 Higher order DE's: Existence and uniqueness

p. 128: 3,5,7,9,10

120-127

4.1 Higher order DE's: Linear independence, non-homogeneous DE's

p. 128: 15,18,23,25,31

133-138

4.3 Linear homogeneous constant coefficient DE's: real roots

p. 139: 3,5,15,31,35

133-138

4.3 Linear homogeneous constant coefficient DE's: complex roots

p. 139: 9,11,25,29,43-48

150-156

4.5 Annihilators

p. 156: 5,17,21,23,31,33

150-156

4.5 Non-homogeneous DE's by annihilators

p. 156: 39,47,51,67

Review

Test 1

182-186

5.1.1 Undamped mass-spring systems

p. 194: 1,2,3,5

182-186

5.1.1 Undamped mass-spring systems

p. 194: 9,11

186-189

5.1.2 Damped mass-spring systems

p. 194: 17,19,21,23,25

189-191

5.1.3 Mass-spring system with external force

p. 194: 31,39

87-88,192-193

5.1.4 Series electrical circuits

p. 194: 45,47,53

Review

256-258

7.1 Laplace transform

p. 261: 5,7,11,25,31,38

262-265

7.2.1 Inverse LT

p. 269: 5,15,23,27
265-269

7.2.2 Solving DE's using LT's

p. 269: 33,35,39
270-274

7.3.1 First translation theorem

p. 278: 5,9,11,15,21,29
274-277

7.3.2 Unit step function

p. 278: 37,41,49,51,53
274-277

7.3.2 Unit step function in a DE

p. 278: 65,71,73
Review

282-286

7.4 Derivative of LT, convolution

p. 289: 1,3,11,19,25,33
292-294

7.5 Dirac delta function

p. 295: 1,3,9,11
295-297

7.6 Solving systems of DE's using LT's

p.299: 1,3,14

Review

Test 2

App-3-App-10

Appendix II.1 Matrices

p. App-18: 1,3,4,7,11,15,25

App-10-App-14

Appendix II.2 Solving linear systems by row reduction

p. App-18: 31,35,39

App-10-App-14

Appendix II.2 Matrix inverse by row reduction

p. App-18: 41,45

App-14-App-18

Appendix II.3 Cramer's rule, eigenvalues and eigenvectors

p. App-18: 47,49,53

Review

304-310

8.1 Systems of DE's

p. 310: 1,11,13,17,21,23

311-315

8.2.1 Linear systems with real, distinct eigenvalues

p.324: 1,3,5,7

320-324

8.2.3 Linear systems with complex eigenvalues

p.324: 33,35,37,39

329-332

8.3.2 Nonhomogeneous systems by variation of parameters

p.332: 11,13,15,29

109-110,297-298

3.3,7.6 Electrical networks

p. 299: 15,16; p. 332: 33

353-355

9.4 Euler's method for linear systems and higher order DE's

P.357: 1,9 (use Euler's method with $h = 0.1$)

Review

Test 3

398-402

11.1 Orthogonal functions

p.402: 1,10,12,17

403-405

11.2 Fourier series

p.407: 1,3,5,9

405-407

11.2 Convergence of FS's

p. 407: Graph FS(x) for 7,11; 17,19

408-411

11.3 Sine and cosine series

p.414: 1,3,5,7,11,13

411-413

11.3 Half-range expansions

p.414: 25,29,41

433-435

12.1 Separation of variables for partial differentials equations

p.436: 1,3,5,11

443-444

12.3 Heat equation, ends held at 0 degrees

p.445: 1,6

12.3 Heat equation, ends insulated

p.445: 3,5

Review

Review

Test 4

Final examination review

Final examination review

Course coordinator: Prof Jim Buchanan, jlbt@usna.edu