

MATH 240 – Differential Equations

MATH 240 · SUGGESTED HOMEWORK · SPRING 2021

Section	Exercises
§ 1.1: Background	1-12 (if non-linear, why?) 13, 15
§ 1.2: Solutions & Initial Value Prob	2, 3, 6, 7, 8, 9, 11, 17, 18, 22, 23, 25, 27
§ 1.3: Direction Fields	1, 3, 5, 10(a-c), 11, 15, 17, 19 (for 11-18, see our "Extras page" and use dfield)
§ 1.4: Euler's Method	1, 5, 7, 11, 15
§ 2.2: Separable Equations (1)	3, 5, 6, 7, 9, 11, 12, 15, 18, 19, 21, 23
§ 2.2: Separable Equations (2)	13, 22, 25
§ 2.3: Linear Equations (1)	1, 3, 4, 5, 7, 11, 17
§ 2.3: Linear Equations (2)	14, 15, 18, 20, 22, 28, READ: 36
§ 2.4: Exact Equations (1)	1, 2, 7, 9, 11, 12, 13, 19, 23, 25
§ 2.4: Exact Equations (2)	6, 8, 16, 22, 26
§ 2.6: Substitutions and Transformations (1)	1, 2, 5, 6, 7, 8, 9, 10, 12, 13 ($t > 0$), 18, 22, 23, 25, 27
§ 2.6: Substitutions and Transformations (2)	Finish problem set.
Chapter 2 Review	Chapter 1 & 2 Review Worksheet
Exam 1	
§ 3.1: Mathematical Modeling	Handout Problems
§ 3.2: Compartmental Analysis (1)	1, 5, 7, 8
§ 3.2: Compartmental Analysis (2)	4, and §2.3: 35
§ 4.1: Introduction to Linear 2nd Order	2, 5, 8
§ 4.2: Second Order Linear Equations	1, 5, 13, 15
§ 4.2: Second Order Linear Equations (1)	7, 17, 19, 22, 39, (27, 29 use any method to determine L.D.)
§ 4.2: Second Order Linear Eqns (2)	(28, 31 use any method to determine L.D.), 37
§ 4.3: Auxiliary Eqns; Complex Roots (1)	1, 3, 9, 11, 17, 21, 22, 24
§ 4.3: Auxiliary Eqns; Complex Roots (2)	26, 29, 31(a-c), 32a, 33a
Exam 2	
§ 4.4: Nonhomogeneous Equations (1)	1-8, 13, 14, 15, 16, 18, 27
§ 4.4: Nonhomogeneous Equations (2)	17, 21, 24, 29
§ 4.5: The Superposition Principle (1)	3, 8, 10, 11, 12, 15

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Section	Exercises
§ 4.5: The Superposition Principle (2)	17, 21, 24, 25, 27, 33, 35
§ 4.6: Variation of Parameters (1)	1, 2, 3, 7, 14
§ 4.6: Variation of Parameters (2)	11, 15, 17
§ 4.7: Variable-Coefficient Equations (1)	5-8, 11, 13, 19
§ 4.7: Variable-Coefficient Equations (2)	1, 2, 24(a,b), 45, 47, 37, 39
§ 4.7: Variable-Coefficient Equations(3)	40, 41, 43, 48
§ 4.9: A Closer Look at Free Vibrations	1, 3, 5, 9, 12, 18
Chapter 4 Review Problems:	1, 3, 7, 9, 11, 21, 25, 30, 31, 35, 38
Exam 3	
§ 9.1: Systems Intro	1, 3, 5, 7, 11
§ 9.2: Linear Algebra Review	1, 3, 7, 12
§ 9.3: Matrix Methods and Vectors	READ SECTION 9.3; work: 1, 4, 5, 21, 23, 25 Note, we will not be finding inverses
§ 9.3: Matrix Methods and Vectors	27, 33, 34, 35, 37, 39
§ 9.5: Eigenvalues/Eigenvectors	3, 5, 7, 10
§ 9.4: Linear Systems in Normal Form (1)	1, 3, 5, 7, 9, 11, 21, 24, 26
§ 9.4: Linear Systems in Normal Form (2)	Get caught up
§ 9.5: Homogeneous Linear Systems (1)	11, 13, 15, 31, 32
§ 9.5: Homogeneous Linear Systems (2)	14 (Get caught up)
§ 9.6: Linear Sys Complex Eigenvals (1)	1, 3, 13, 14
§ 9.6: Linear Sys Complex Eigenvals (2)	Handout (Get caught up)
§ 5.4: Intro to the Phase Plane (1)	
Qualitative Methods	Handout Problems
Exam 4	