

Assignments and Testable Problems

Assignment #1:

Part I:

1. In this problem you will study solutions of the differential equation

$$\frac{dy}{dx} = x + y$$

by using the direction field. Draw a large pair of axes and mark off units from -4 to +4 on both. Sketch the direction field given by our equation. Do this by first sketching the isoclines for slopes $m = -2, m = 1, m = 0, m = 1$, and $m = 2$. On this same graph, sketch, as best you can, a couple of solutions, using just the information given by these four isoclines.

2. Consider an animal population $P(t)$ that is modeled by the equation

$$\frac{dP}{dt} = P(100 - P)$$

- Find the general solution by separation of variable.
 - Find the limiting population.
3. Find the general solution of

$$y'' + y' + 2y = 0$$

Part II:

Section	Assignment questions	Testable questions
1.3	17, 18	15, 16
1.4	23, 25,	1, 3, 5, 7, 20, 21
1.5	4, 8	10, 12, 19
1.6	1, 9, 22, 23, 31, 43, 53	2, 10, 18, 20, 32, 46, 54
2.1	33, 40	34, 39
2.2	8, 21	9, 22
2.3	11, 24	12, 25
2.5	2, 13	52, 53
2.8	3	4

Assignment #2:

Section	Assignment questions	Testable questions
4.1	3, 4, 8, 18, 29, 30, 32	2, 6, 20, 23, 27, 26
4.2	3, 5, 17, 19, 23	4, 6, 18, 20, 22
4.3	6, 9, 11, 27	7, 13, 28
4.4	9, 15, 19, 28, 29	11, 16, 20, 26, 30
4.5	2, 3, 11, 25	4, 8, 12, 26
4.6	1, 9	3, 10

Assignment #3:

Part I:

1. Transform the given differential equation into a equivalent system of first-order differential equations:

- $x'' + 3x' + 7x = t^2$
- $x^{(4)} + 6x'' - 3x' + x = \cos(3t)$

Part II:

Section	Assignment questions	Testable questions
5.2	3, 23	4, 24
5.3	13, 20	15, 16
5.4	6, 26	9, 20
5.6	5, 12	6, 13
5.7	1, 9, 21	3, 10
5.8	9, 11, 23	10, 12, 24