

Math 118 – Week 4 Assignments
Fall Term 2003
BUCKMIRE

Monday September 15 *Class 7:*

We will continue our analysis of initial value problems with a variety of population growth models. Of particular interest is the Existence and Uniqueness Theorem for IVPs.

Reading:

Smith & Minton, p. 503-509, 516-518, p 512-514

Homework #5 (5 points):

Verify that the given formula is a solution to the initial value problem

(a) $y' = y^2, y(0) = 5$ $y(t) = 1/(\frac{1}{5} - t)$

(b) $y' = y^3, y(0) = 5$ $y(t) = 1/\sqrt{\frac{1}{25} - t}$

(c) $y' = y^4, y(0) = 5$ $y(t) = 1/\sqrt[3]{\frac{1}{125} - t}$

(d) Write a general formula for the solution $y(t)$ to the initial value problem $y' = y^n, y(0) = C$ for any integer $n > 1$ and any constant $C \geq 0$

(e) Write a general formula for the solution $y(t)$ to the initial value problem $y' = t^n, y(0) = C$ for any integer $n > 1$ and any constant $C \geq 0$

Due: Class 8

Wednesday September 17 *Class 8:*

We will continue with more challenging initial value problems based on Newton's Law of Cooling.

Reading:

Smith & Minton, p. 506-508

Homework #6 (4 points):

Complete the handout on the initial value problem concerning glucose infusion.

Due: Class 9

Thursday September 18 Lab #2: Newton's Method

Topic: We will construct Newton's method as applied to a general function. With this in hand, we will compare this method to the Babylonian method for finding square roots and reciprocals.

Friday September 19 *Class 9:*

We will begin the discussion of local linearity and its relation to the definition of a derivative. We'll construct the "microscope equation" and demonstrate its uses in estimation and error analysis.

Reading:

Smith & Minton, p. 170-171

Homework:

Quiz # 3: The Microscope Approximation

Due: Class 10