

Week 1

Deliverables

- Report 1: Assignments 1–4.

Introductory MATLAB

To solve the assignments of this week, you need some basic MATLAB programming skills. In particular, you must know how to graph a mathematical expression in MATLAB, and how to save your results for later use.

The following exercises will help you acquire these skills:

- **P:** Exercise 2.3.1 (only down to the paragraph “In Section 1.1 we saw ...”)
- **P:** Exercises 2.3.2–2.3.4 and 3.3.1–3.3.5.

After you have worked on these exercises, we will hand out an example application where the lines of code have been removed, scrambled around, and placed on a separate page.

- Reconstruct the example application in a MATLAB m-file and run it.
- Write `doc plot` in the MATLAB command window and familiarize yourself with the `plot` function.
- **P:** Exercise 1(a) of Section 9.7. (*Hint:* See Figure 9.6 of Section 9.1.3 in **P**.)

Growth constrained by nutrition availability

Assignments 1 and 2 require you to find a mathematical model that describes the relationship between two physical quantities one of which is constrained by the other. This is analogous to the growth rate of a population being constrained by the availability of some nutrient. To learn about this type of model, work on the following exercises (when you are asked to use a graphing calculator, use MATLAB instead):

- **C:** Problems 42–44 of Section 1.2.9.

Hint: These problems are closely related to Example 6 of Section 1.2.3 in **C**.

Now, solve Assignments 1 and 2.

Chemical reactions

Assignments 3 and 4 are based on a small variation over the mathematical model for constrained growth. To learn about this variation over the same model, you should take a look at the following exercises concerning (bio)chemical reactions:

- **C:** Problem 15 of Section 1.5.
- **C:** Problem 46 of Section 1.2.9.

Hint: Answers to odd-numbered problems are available in the back of the book.

Now, solve Assignments 3 and 4.

Curriculum

C Sections 1.2–1.3.3. *Elementary Functions and Graphing*.

LA Section 1.1. *Vectors and Matrices*.

P Chapters 1–3 and Sections 9–9.2. *Introduction, Expressions, and 2D Plots and Figures*.

Although the text in **C** may repeat some of what you already know, we suggest that you read it as an introduction to mathematics in English. In addition, the many examples in **C** are often quite relevant to the health sciences.