

MATH 245, Spring 2016

HOMEWORK 1

due 10:45AM on Wednesday, February 17.

Background reading: Sections 1.1 and 1.2 to page 18, Section 2.1, Section 3.1, page 150, Section 3.3, and Section 3.6.

Follow the posted homework guidelines when completing this assignment.

In particular, remember that you must **fully justify** any calculations or assertions you make.

Only consult with your classmates or professor to discuss the problem set. While it is not permitted to use the internet to search for (or ask for) an answer or solution to specific exercises (like 1-4), it is permitted and often encouraged to consult the internet or additional resources for help in **understanding** definitions or **researching** background information such as might be required when answering a question like 1-3.

1-1. Below are three different vague scenarios. Choose **one of the three** to focus on for this question. Next, identify a **precise problem statement** related to the scenario that you would like to study. Then, determine **eight variables** that affect your proposed problem statement. Last, of those eight variables, choose between three and five of the eight variables that are the most important, and **explain why** you think they are more important than the rest.

- Walmart is building and illuminating a new parking lot.
- Queens College wants to redesign a lecture hall for a large class.
- A toy manufacturer is determining the toys it will make and sell.

1-2. There are two Sidelight stories at the end of Section 2.1 on pages 76 and 77. For each story, write a paragraph in which you determine and justify the type of error involved in the story. After this, write a third paragraph that discusses the difference between the two errors encountered. Last, write a few sentences explaining the morals of these errors and how it relates in general to the modeling process in real-life.

1-3. Read the Sidelight stories at the end of Section 3.2 on pages 165–166. Take one of the four situations presented (or one of your own!) and write a few paragraphs that explain explicitly how a model that was considered descriptively realistic at one time or in one place would not be considered descriptively realistic at present or in a different culture.

1-4. Suppose you are buying a **cubical** box to fill with candy. Suppose that the **true** length of the side of the box is 10 inches. However, the length of the side of the box is **measured** to be 8 inches long.

- (a) What is the “error in”? That is, find the percentage error for the measurement of the side of the box.
- (b) Applying the model, determine the “error out”. That is, determine the percentage error for the volume of candy.
- (c) Write a paragraph about the robustness of this model.