Section 5.1 IRA Guide

Introduction

Screen 1: This problem asks you to create a relative frequency distribution. Refer back to Section 2.1 for a refresher.

Screen 2: List of Objectives
You can skip the video on this screen for an introduction to probability and its rules.

Screen 3: Definition of the *Law of Large Numbers*

Screen 4: Definition of *experiment*, *sample space*, and *event*. Watch the Caution video, as well as the In Other Words video.

Screen 5: Example 1 will help you understand the basic definitions from the previous screen. Watch the By Hand video solution.

Screen 6: This problem asks you to construct the sample space of an experiment.

Objective 1: Apply the Rules of Probabilities

Screen 1: Write down the two rules of probabilities on this screen for future use. You will also find the definition of a *Probability Model*, which must satisfy these two rules.
Watch the In Other Words video.

Screen 2: Example 2 shows an example of a probability model. Watch the video.

Screen 3: I recommend keeping a list of the key concepts from this page available as you work through this section. Watch the Caution video.

Screen 4: This problem is based on one of the key ideas on the previous screen.

Screen 5: Definition of an *Unusual Event*. We will use 0.05 (or 5%) for this portion of the course, but that will change later in the course depending on the consequences of our work. The more serious the consequences, the lower the percentage will drop.

Objective 2: Compute and Interpret Probabilities Using the Empirical Method

Screen 1: Definition of the *Empirical Approach*, as well as the formula for estimating a probability based on the outcomes of an experiment.

Screen 2: Click the link for Activity 1, and work your way through the four parts to get a better understanding of how the empirical method works.

Screen 3: Example 3 shows how to use a relative frequency to approximate a probability. No video here – so just read through it.

Screen 4: Example 4 shows how to build a probability model from survey data. Note that this is essentially the same as constructing a relative frequency distribution.

Screen 5: A quick explanation of why a survey is essentially a probability experiment.

Screen 6: This problem asks you to build a probability model from the results of a survey and answer questions based on that.

Objective 3: Compute and Interpret Probabilities Using the Classical Method

Screen 1: Definition of the **Classical Method** along with its formula. Notice how the formula is similar to that of the empirical method.

Screen 2: Example 5 shows how to compute probabilities involving the roll of a pair of dice using the classical method.

Screen 3: This problem asks you to compute a probability using the classical method.

Screen 4: A comparison of empirical probabilities and classical probabilities. This will be important to understand when we begin discussing inferential statistics in chapters 9-13.

Screen 5: Example 6 goes over how to compute probabilities using equally likely outcomes (classical method). Watch the By Hand video solution.

Screen 6: This problem is based on Example 6 on the previous screen.

Screen 7: Example 7 compares the classical and empirical methods.

Screen 8: A comparison of the two methods and why they will often give different results. The Law of Large Numbers tells us that these differences will decrease as the number of trials of the experiment increases.

Objective 4: Use Simulation to Obtain Data Based on Probabilities

Screen 1: Watch the video on the left side to see how StatCrunch's simulation abilities can be used to obtain data based on probabilities. We can create our own experimental results to use the empirical method. Watch the video to get an idea of what is occurring.

Objective 5: Recognize and Interpret Subjective Probabilities

Screen 1: Definition of a **Subjective Probability**.

Screen 2: End of Section