Section 6.2 IRA

Introduction

Screen 1: This problem uses the Empirical Rule from Section 3.2.

Screen 2: This problem uses the Addition Rule for Disjoint Events from Section 5.2.

Screen 3: This problem involves the Complement Rule from Section 5.2.

Screen 4: In this problem you have to determine whether two events are independent or dependent. This was covered in Section 5.3.

Screen 5: This problem uses the Multiplication Rule for Independent Events from Section 5.3.

Screen 6: In this problem you have to compute combinations, which was covered in Section 5.5.

Screen 7: List of Objectives

Objective 1: Determine Whether a Probability Experiment is a Binomial Experiment

Screen 1: Definition of a binomial probability distribution.
Each outcome can be classified as either a success (an outcome we are interested in) or a failure (an outcome we are not interested in).
Look for a number of trials (n) and a probability of success (p). The probability of success for an individual trial (p) must stay constant – that means that the trials have to be independent.
Watch the In Other Words video.

Screen 2: Watch the video which shows all of the criterial for a binomial experiment.

Screen 3: Example 1 covers how to identify binomial experiments as well as how to identify all important values. Be sure to watch the video solution.

Screen 4: This problem is based on Example 1 on the previous screen.

Objective 2: Compute Probabilities of Binomial Experiments

Screen 1: This long video (13 minutes) shows the development of the binomial formula, which we will not be using. I'd recommend skipping this entirely, unless you want to work on developing a Chicago accent.

Screen 2: This screen shows how to plug into the formula. Again, we will use StatCrunch for these calculations, so you can skip this.

Screen 3: One more round of the binomial formula – you can skip over this.

Screen 4: This screen is VERY important. You need to be sure that you know which symbols go with which phrases in order to effectively use StatCrunch. In my experience students struggle with "at least". At least 4 means 4 or more (≥ 4) but many students think of "< 4".

Screen 5: Example 2 shows how to compute binomial probabilities. You should watch the StatCrunch video solution, and only use StatCrunch for all of these calculations.

Screen 6: This problem is based on Example 2 on the previous screen. Be sure to use StatCrunch instead of the formula suggested in "Help Me Solve This" or "View An Example".

Screen 7: Another (multi-step) problem for computing binomial probabilities. **USE STATCRUNCH**. (The time you save is well worth it.)

Objective 3: Compute the Mean and Standard Deviation of a Binomial Random Variable

Screen 1: The formulas are presented for the mean and standard deviation of a binomial distribution. StatCrunch does not compute these so you will need to use your calculator and these formulas to calculate these measures.

Screen 2: Example 3 shows how to calculate the mean and standard deviation of a binomial distribution. Be sure to watch the video solution. This skill will be very important later when we try to determine whether an outcome is unusual or not.

Screen 3: This problem is based on Example 3 on the previous screen.

Objective 4: Graph a Binomial Probability Distribution

Screen 1: This screen discusses how to graph a binomial probability distribution. StatCrunch automatically does that so no worries.

Screen 2: Example 4 shows how to graph a binomial distribution with StatCrunch.

Screen 3: This screen discusses the shape of the binomial distribution for various values of p.

Screen 4: For this problem you can construct the binomial distribution using StatCrunch in the same way as I did in Example 4 on Screen 2. For part (b) use the formulas as I did in Example 3 of Objective 3. For part (c) StatCrunch will already display the graph from part (a), and the shape of the graph is covered on the previous screen.

Screen 5: Click on the link for Activity 1. The activity on this screen will help you to understand the role of n in the shape of the distribution.

Screen 6: Is an observation unusual? Begin by computing the mean $\left(\mu = np\right)$ and standard deviation $\left(\sigma = \sqrt{np\left(1-p\right)}\right)$. The lower fence is $\mu - 2\sigma$, and the upper fence is $\mu + 2\sigma$. Any observation outside these fences is considered unusual.

Screen 7: Example 5 goes over how to determine if an observation is unusual. Be sure to watch the video solution.

Screen 8: This problem is based on Example 5 on the previous screen. Part (a) asks for the mean, and then you have to determine if the result given is unusual.

Screen 9: End of Section