Section 6.3 IRA Guide

Introduction

Screen 1: List of Objectives

Objective 1: Determine Whether a Probability Experiment Follows a Poisson Process

Screen 1: Explanation of the Poisson Probability Distribution. This still involves a count of the number of successes or occurrences X like the binomial distribution. Instead of using n trials and a probability of success p, this will depend on the mean number of successes in an interval.

Screen 2: Example 1 shows a quick scenario of a problem following the Poisson distribution. (Cars typically arrive at a rate of 2 cars/minute, and the experiment lasts 20 minutes.)

Screen 3: A proper listing of the 3 conditions for a Poisson process.

Screen 4: This problem deals with the conditions for a Poisson process on Screen 3.

Objective 2: Compute Probabilities of a Poisson Random Variable

Screen 1: Formula for Poisson probabilities. You can skip this because we will use StatCrunch, not the formula.

Screen 2: Example 2 shows how to compute Poisson probabilities. You should watch the StatCrunch video solution to see how to solve these problems.

Screen 3: This problem is based upon Example 2 on the previous screen. Be sure to use StatCrunch for these calculations.

Objective 3: Find the Mean and Standard Deviation of a Poisson Random Variable

Screen 1: The mean of a Poisson distribution is given by $\mu = \lambda t$. Lambda (λ) is the average rate per 1 unit of time, and t is the length of the time interval.
The standard deviation sigma is simply the square root of the mean: $\sigma = \sqrt{\mu}$

Screen 2: Restatement of the Poisson formula. You can skip this since we are using StatCrunch for this.

Screen 3: Example 3 goes over how to find the mean and standard deviation of the Poisson distribution, as well as more Poisson calculations. It finishes with trying to determine if a particular outcome is unusual, which is similar to the "unusual binomial" problems from Section 6.2 except we are looking for a probability that is less than 0.05 instead of using the fences.
Be sure to watch the StatCrunch video solution.

Screen 4: This problem is based on Example 3 on the previous screen.

By the way, the mean for this problem is equal to the number of hits divided by the number of years. Use as many decimal places as possible when you enter the mean into StatCrunch.

Screen 5: End of Section