Math Virtual Learning

AP stats / Conducting a Chi squared GOF

May 14th, 2020

Lesson: May , 2020

Objective/Learning Target:
Students will be able to apply the Chi squared goodness of fit test.

Review #1

You decide to toss a fair coin 10,000 times in the hope that it will lead you to a deeper understanding of the laws of probability. Which of the following statements is true?

1. It is unlikely that you will get more than 5000 heads.
2. Whenever you get a string of 15 tails in a row, it becomes more likely that the next toss will be a heads.
3. The fraction of heads should be close to ½
4. The chance that the 100th toss will be a head depends somewhat on the results of the first 99 tosses
5. All of the above.

Review #2

China has 1.2 billion people. Marketers want to know which international brands they have heard of. A large study showed that 62% of all Chinese adults have heard of Coca-Cola. You want to simulate choosing a Chinese at random and asking if he or she has heard of Coca-Cola. One correct way to assign random digits to simulate the answer is…

1. One digit simulates one person's answer, odd is yes, even is no
2. One digit simulates one person's answer. 0-6 mean yes and 7-9 mean no
3. One digit simulates one person's answer. 0-9 simulate how many in the sample said yes.
4. Two digits simulate one person's answer. 0-61 mean yes, 62-99 mean no
5. Two digits simulate one person's answer. 0-62 mean yes, 63-99 mean no

Answers

1. The answer is 3. We are just as likely to get more than 5000 as we are less than 5000. The tosses are also independent so previous tosses do not change probability of getting heads.
2. The answer is 4. To simulate this, we need a random process with the same probability of yes and no as the study. We cannot get a probability of 62% with one digit. We want to simulate individuals not the sample counts. We get a sample by repeating the simulation over and over again. 0-62 would actually give a 63% chance of success, you have to count 0.

Chi-squared goodness of fit

Yesterday, you studied the Chi-squared setting. It provides us the sampling distribution and setting to test multiple p-values at once. It is not the only sampling distribution to describe categorical data, but it is an important one that ends up being used a lot.

Today, the goal is to be able to conduct the Chi squared GOF test from beginning to end. Review the following video, then try the practice at the end.

[Chi Squared GOF](#)

Extra Practice

[Free Response Problem](#)

[Answers](#)