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AP STATISTICS

Using the Sampling Distribution Model for Proportions

Example 1: The Centers for Disease Control and Prevention report that 22% of 18-year old women in the United States have a body mass index (BMI) of 25 or more – a value considered by the National Heart Lung and Blood Institute to be associated with increased health risks.

As a part of a routine health check at a large college, the physical education department usually requires students to come in to be measured and weighed. This year the department decided to try out a self-report system. It asked 200 randomly selected female students to report their heights and weights (from which their BMIs could be calculated). Only 31 of these students had BMIs greater than 25.

***Is this proportion of high-BMI students unusually small? First check all of the conditions. Can we use the Normal model to describe the sampling distribution of the proportions of respondents with BMIs above 25?***

***Now, answer the question.***

Example 2:

1. You want to poll a random sample of 100 students at a large university to see if they are in favor of the proposed location of the new student center. Of course, you’ll get just one number, your sample proportion, $\hat{p}$. But if you imagined all of the possible samples of 100 students you could draw and imagined the histogram of all the sample proportions from these samples, what shape would it have?
2. Where would the center of that histogram be?
3. If you think that about half of the students are in favor of the plan, what would the standard deviation of the sample proportions be?

Example 3: Suppose that about 13% of the population is left-handed. A 200-seat school auditorium has been built with 15 lefty seats. In a class of 90 students, what’s the probability that there will not be enough seats for the left handed students?

***First, check all of the conditions. Can we use the Normal model to describe the sampling distribution?***

***Make a picture. Sketch the model and shade the area we are interested in.***

***Now, answer your original question.***