Name _____

Investigation 16: Too Many Peanuts?
Worksheet 16.1 Peanut Investigation

Scenario
Did you ever buy a can of mixed nuts and it seemed that all you got in the can was peanuts and you were hoping for a lot of cashews and almonds?

A 1964 *Consumer Reports* investigation of 124 cans of mixed nuts, representing 31 brands bought in 17 American cities, determined that most mixed nuts at that time were mostly peanuts, often 75%. As of 1993, the Food and Drug Administration (FDA) requires that a container of mixed nuts must contain at least four different varieties of tree nuts or peanuts. Each kind of nut must be present not less than 2% and not more than 80% of the number of nuts.

A major manufacturer of cans of mixed nuts makes the claim that their 10.3 oz. cans contain approximately 50% peanuts in their cans that have a mixture of peanuts, almonds, cashews, pecans, and brazil nuts.

As part of a statistics project, an 11^{th} grader purchased a 10.3 oz. can of mixed nuts and found 142 peanuts in the can that contained 258 mixed nuts or approximately 55% peanuts.

Does this mean that the manufacturer's claim of approximately 50% peanuts is not correct? Does this provide convincing evidence that cans of mixed nuts from this manufacturer contain more than 50% peanuts?

Statistical Question _____

Collect Data
Assume that the population proportion of peanuts in a 10.3 oz. can of mixed nuts is 50% and the sample of 258 nuts (one can) was a random sample of all the mixed nuts produced by the manufacturer.

1. Assuming the claim that 50% of a can is peanuts, how many peanuts should be in a can of 258 nuts?

2. If a random sample of 258 mixed nuts yielded 134 peanuts, would you think that is an unusual result? Why or why not?

3. If a random sample of 258 mixed nuts yielded 155 peanuts, would you think that is an unusual result? Why or why not?

4. As directed by your teacher, use statistical software and construct a simulated sampling distribution of at least 200 sample proportions based on a sample size of 258 - number of nuts in the can – and assuming a population proportion of 50%.

Analyze the data

5. What do you expect the mean of the simulated sampling distribution to equal?

6. Using statistical software, find the mean and standard deviation of the simulated sampling distribution.

7. Describe the simulated sampling distribution of the sample proportions.

8. Count the sample proportions on the plot that are greater than or equal to the proportion of peanuts in the class can. (0.55 in this example) How many sample proportions were greater than or equal to the class proportion of peanuts?

9. Estimate the probability of the class getting a can of mixed nuts and obtaining a sample proportion of __% *(in this example, 55%)* peanuts or greater from a population with the population proportion equal to 0.50 peanuts.

Interpret the results in the context of the original question

10. Do you think that the proportion of peanuts in the class can of mixed nuts was an unusual result assuming that the manufacturer's claim of 50% is correct?

11. What proportion of peanuts would you consider to be an unusual result? Based on the simulated sampling distribution, what is an estimate for the probability of obtaining that proportion or more by chance?

12. If you got such a can (high proportion of peanuts), would you have reason to believe that the manufacturer's claim is not correct?

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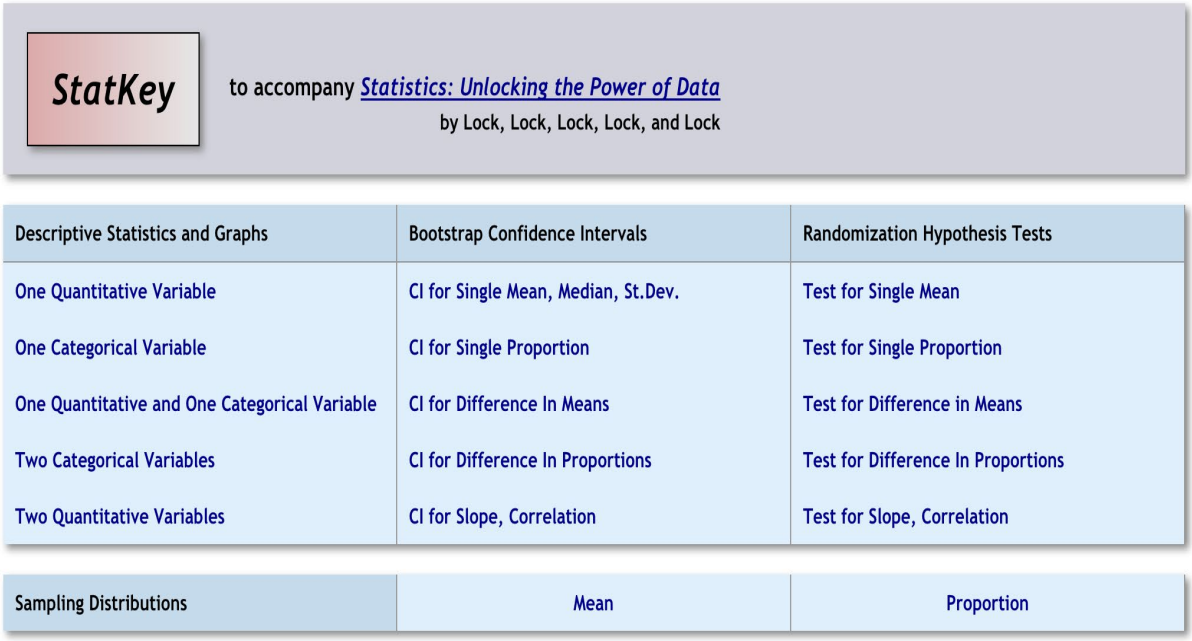
Worksheet 16.2 StatKey Directions

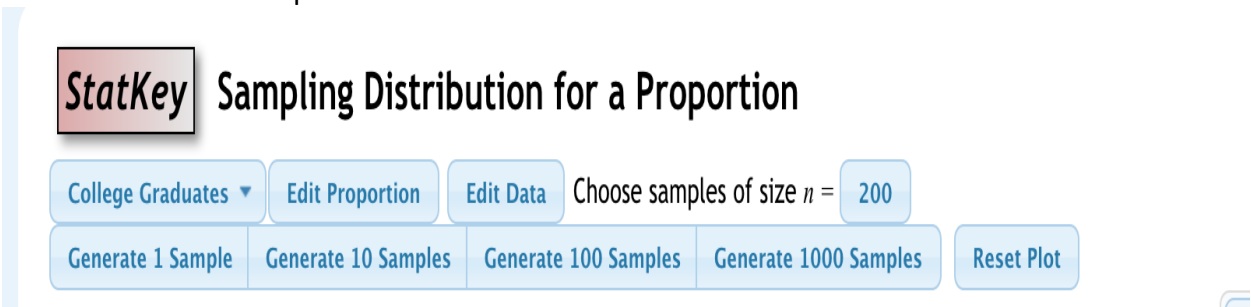
Steps to construct a sampling distribution of sample proportions based on sample size of 258 and a population proportion of 50%.

http://www.lock5stat.com/StatKey/

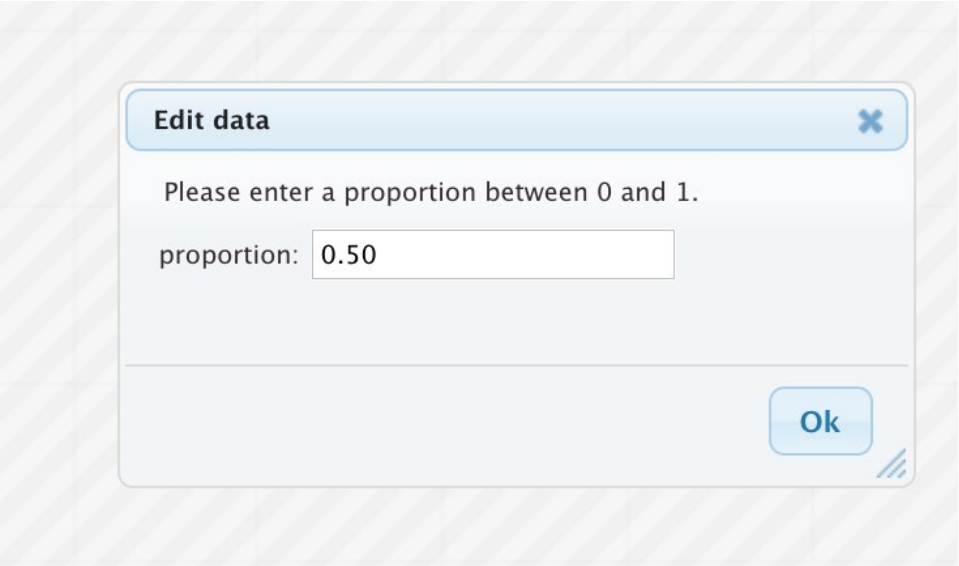
1. Select Sampling Distributions – Proportion



2. Select Edit Proportion



3. Enter 0.50 and click OK



4. Enter 258 for samples of size n.

5. Generate 100 samples twice for a total of 200 samples.

6. Count the number of sample proportions that are 0.55 and greater.