

For each of the following “I can...” statements, complete the problem without using your notes. Check your answers. If you completed the problem successfully without your notes, then check the yes box (Y). If you got the answer wrong or had to refer to your notes, check the no box (N). You should focus most of your studying on the problems for which you checked no.

	Y	N	I Can...
1.			<p>I can differentiate between sample surveys, observational studies, and experiments.</p> <p>For the following problems, determine whether the given method of data collection is a sample survey, an observational study, or an experiment. Explain your choice. Then also identify the population, the sample, and the characteristic of interest for each.</p> <p>(a) A high school principal wants to determine whether students who work in groups in geometry class receive higher grades than students who do not work in groups. He randomly assigns 5 of the geometry classes to participate in group work and 5 of the geometry classes to complete their work individually. Type: Population: Sample: Characteristic of Interest:</p> <p>(b) You are curious about student interest in your school for doing volunteer work in the community. You ask 120 randomly selected students in your school whether they are interested in doing volunteer work in the community. Type: Population: Sample: Characteristic of Interest:</p> <p>(c) A researcher wants to know whether female professional athletes are more prone to knee injuries than male professional athletes. She gathers data from 6 different sports organizations that have injury records for all of their male and female professional athletes. Type: Population: Sample: Characteristic of Interest:</p>

2.		<p>I can identify possible biases that occur during surveys, observational studies, and experiments.</p> <p>Identify the possible bias(es) for each. Explain how this might cause the results to be misleading or skewed inappropriately.</p> <p>(a) A professor divided his class into females and males, then he randomly selected a sample from each group.</p> <p>(b) A pollster stops patrons on Ninth Street in Durham to ask “Do you feel represented by Donald Trump as the president of this country?”</p> <p>(c) In order to get a set of data of girls’ heights, Lisa uses the heights of all the girls in her class.</p> <p>(d) A city manager randomly selects a block in the city and surveys all of the residents of that block to see if they are satisfied with the city parks program.</p>
3.		<p>I can compare experiments, surveys & observational studies.</p> <p>Think about the three types of studies: observational study, survey, and experiment.</p> <p>(a) Which one(s) can normally be generalized to a larger population? Why?</p> <p>(b) Which one(s) can establish causation? Why?</p>

4.		<p>I can use the <u>Empirical Rule</u> for Normal Distributions to determine the percent of data in a given interval. (NO CALCULATOR)</p> <p>A study investigated the effect of car speed on accident severity. As part of the study, the vehicle speed at impact was extracted from a sample of 6000 accident reports of fatal automobile accidents. Analysis revealed that vehicle speed at impact could be described by a normal distribution with mean $\mu = 44$ mph and standard deviation $\sigma = 14$ mph.</p> <p>a. Draw a normal curve that represents the speed at impact for fatal accidents. Be sure to add appropriate scaling to the horizontal axis.</p> <p>b. Approximately what percent of vehicle speeds were between 30 mph and 58 mph?</p> <p>c. Approximately what percent of vehicle speeds were less than 30 mph?</p> <p>d. Approximately what percent of vehicle speeds exceeded 72 mph?</p>
5.		<p>I can use a z-score to calculate percent of data below, above, or between given data values in a normal distribution using technology. (WITH CALCULATOR)</p> <p>The Army finds that the head sizes (forehead circumference) of soldiers vary according to the Normal distribution with mean $\mu = 22.8$ inches and standard deviation $\sigma = 1.1$ inches.</p> <p>a. What percent of soldiers have head size at least 21 inches?</p> <p>b. What percent of soldiers have head size between 21 inches and 23 inches?</p>

6.

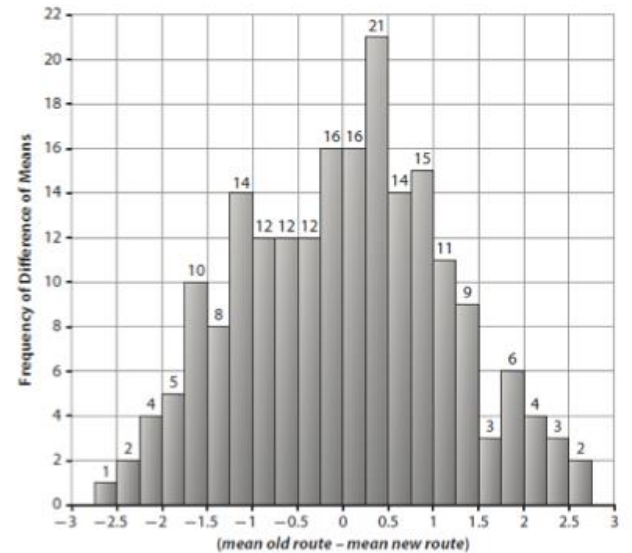
I can use simulation to determine whether there is statistically significant evidence.

Daniel recently discovered a new route to school. He wondered if the travel times were different for the two routes. He decided to do an experiment. He randomly assigned five days to the old route and five days to the new route. The travel times (in minutes) for each day are given below.

Old Route	New Route
8.5	8.5
11.3	12.4
10.4	7.9
12.7	9.0
9.5	8.8

- a. Determine the population means of the data above. Then find the difference in the means.

- b. Daniel uses the data to perform 200 runs and creates the randomization distribution to the right. The values shown in the histogram are *mean old route* – *mean new route*. Determine the 95% confidence interval for Daniel's data if the mean of the randomization test is 0.14 with a standard deviation of 0.79.



- c. Use the randomization distribution and your work from parts a and b to determine whether there is statistical significance that the travel times are different. Explain what Daniel can conclude from this experiment.