

1. Answer the following questions about normal distributions.
  - a. If the mean of a sample is 57 and the standard deviation is 5, what is the 95% confidence interval?
  - b. If the mean of a sample is 3.7 and the standard deviation is 0.3, what is the 68% confidence interval?
  - c. If the mean of a sample is 60 and the standard deviation is 4, what is the 99.7% confidence interval?
2. If you sampled the heart rate of elephants and mice and plotted a frequency distribution graph, explain why you think the distribution is uni-modal (or is it bi-modal)?
3. In the general population, those who had graduate degrees earned \$63,000 per year (with a standard deviation of \$9000).
  - a. What percentage of these retirees (with master's degrees or Phd's) earn less than \$36,000?
  - b. What percentage of these retirees (with master's degrees or Phd's) earn between \$54,000 and \$81,000?
  - c. What percentage of these retirees (with master's degrees or Phd's) earn between \$72,000 and \$90,000?
4. Fred has a raw score of 89 on his math test. The mean for the test was 84 and the standard deviation was 3. He scored a 50 on his science test. The mean for the science test was 45 and the standard deviation was 5. On which test did he do better on compared to those who took the test? Justify your answer.
5. Why do we care about sampling bias?
6. What is the difference between a statistical study and the method of sampling?
7. Data were obtained by measuring the heart rate of adult males. Assuming the sample was taken using the most reliable method, how does sampling mean relate to the mean of the population from which the sample was taken?
8. The following data was obtained by measuring the resting heart rate of patients waiting in a dentist's office for their turn to receive their dental treatment one random day of the week.

60	65	70	65	60	68	78	88	84	74
64	54	55	65	75	85	95	90	80	70

- a. What type of sampling method was used?
- b. Give some factors why this sample may be biased.
- c. Calculate the mean and standard deviation of the resting heart rate of the sample.

- d. How accurately do these statistics reflect that of the resting heart rate of the citizens of the city in which the patients live? Why?
- e. What could you do to ensure the results would more accurately reflected the mean of the general population?
9. If you take the temperature of every 5<sup>th</sup> person who enters the doctor's office,
- What type of sampling method is this?
  - What factors could contribute to sampling bias for this sample?
10. If you want to determine if a medication is effective at reducing high blood pressure:
- What type of statistical study will you use?
  - What type of sampling method will you use for your study in order to reduce sampling bias.
11. What is your "null hypothesis" for the effectiveness of your blood pressure medication in the test of problem 10?
12. What does rejecting the null hypothesis mean for problem #11?
13. What does statistical significance mean?
14. What does 95% confidence interval mean?
15. Find the oblique asymptote:  $y = \frac{2x^2 - 3x + 4}{3x - 3}$
16. A Ferris Wheel has a radius of 50 feet. The bottom of the wheel is 3 feet above the ground. It takes 20 seconds to complete one revolution.
- Draw a picture of the Ferris wheel with dimensions (distances from ground level) for the following features of your drawing: bottom of the wheel, center of the wheel, top of the wheel.
  - Write an equation that models the height above ground (as a function of time) of a person riding the Ferris wheel.