STAT 235 PRACTICE LAB EXAM 2 SOLUTIONS

Instructions

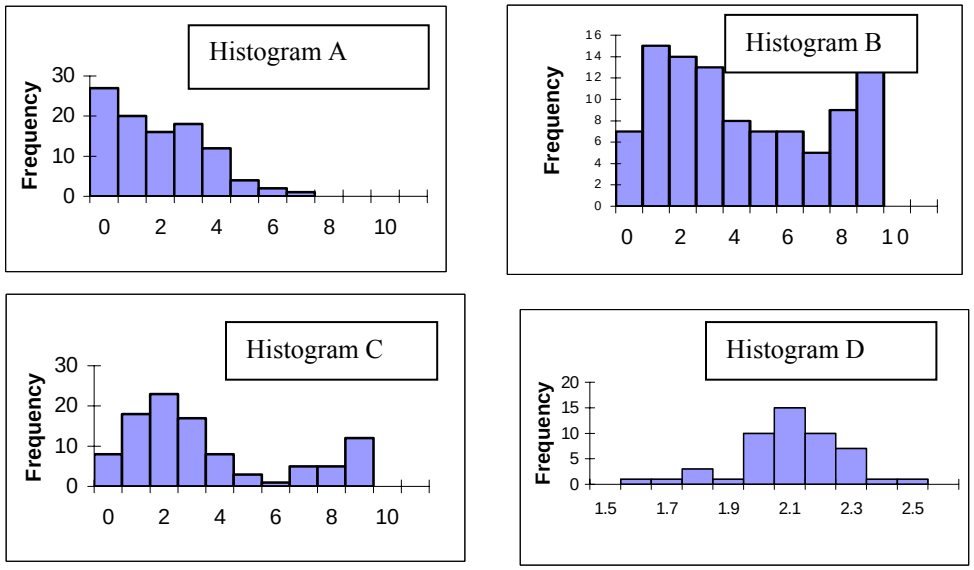
1. This is a closed book exam. You are not allowed to use a hand calculator.

2. This is a multiple-choice exam. It consists of 21 single questions. For each question, carry out the appropriate analysis using Excel and circle the correct answer in your exam sheet. All answers are rounded to four digits. Each single question is worth 1 point.

3. The number of questions and the topics covered in the actual lab exam may be different from those in the practice exam. Some questions require using the template *template.xls* to calculate the probabilities for binomial, Poisson, and normal distribution.

Questions

1. Which of the four histograms shown below is the most likely histogram of 100 sample means of samples of size n=100 selected randomly from a right skewed distribution with the mean 2 and standard deviation $\sigma = 2$?



(a) Histogram A (b) Histogram B (c) Histogram C **(d) Histogram D**

2. Refer to Question 1. Which of the following five numbers is the best estimate of the standard deviation of the 100 sample means?

(a) 0.10 **(b) 0.20** (c) 0.30 (d) 0.60 (e) 2

A random sample of 100 students from the population of students at the University of Alberta was obtained and the number of pets owned by each student in the sample was recorded. The results are saved in the file *samex2.xls* located on *Stat 151 Laboratories* web site (*Lab Exam Test Bank, Exam 2, and Data*). Download the file and use Excel to answer Questions 3-7.

3. Calculate the mean, first quartile, the second quartile (median), and the third quartile.

(i) The mean number of pets is

(a) 0 (b) 0.55 (c) 0.73 **(d) 0.95** (e) 1.4

(ii) The first quartile is

(a) 0 (b) 1 (c) 2 (d) 3 (e) 4

(iii) The second quartile (median) is

(a) 0 **(b) 1** (c) 2 (d) 3 (e) 4

(iv) The third quartile is

(a) 0 (b) 1 **(c) 2** (d) 3 (e) 4

4. What can be said about the distribution of the number of pets owned by students at the University based on the data? You may obtain a histogram to answer the question.

(a) The distribution is right skewed,
(b) The distribution is left skewed,
(c) The distribution is symmetric,
(d) The distribution is neither left skewed nor right skewed,
(e) It is not possible to answer the question given the information in Question 1.

5. Suppose that the number of pets owned by the University students follows a Poisson with the mean 0.95. Use the template to obtain the probability that a randomly selected student owns at most one pet is

(a) 0.3851 (b) 0.4216 (c) 0.4537 (d) 0.5782 **(e) 0.7541**

6. We refer to data in Question 3. A 95% confidence interval for the mean number of pets owned by students at the University of Alberta is

(a) 0.95±0.18997 (b) 0.95±0.23945 (c) 0.95±0.2957 (d) 0.95±0.3456 (e) 1±0.38955

7. Refer to data in Question 3. We test the null hypothesis that the mean number of pets owned by students at the University exceeds 1. The value of the test statistic is

(a) -0.6853 **(b) -0.5222** (c) -0.3421 (d) -0.2311 (e) 0.3356

8. In order to evaluate the effect of exercise on heart rate, the heart rate of five randomly selected subjects was measured before and after aerobic exercise. In the table below, we give the resting heart rate (beats per minute) and the heart rate at the end of exercise for each of the five subjects:

	Heart Rate (beats per minute)				
Resting	60	89	84	78	85
Final	75	99	93	89	85

Which of the following tests available in Excel is the most suitable to see whether the aerobic exercise raises heart rate significantly?

(a) t-Test: Paired Two Sample for Mean
(b) t-Test: Two Sample Assuming Equal Variances
(c) t-Test: Two Sample Assuming Unequal Variances
(d) z-Test: Two Sample for Mean
(e) None of the above

9. Refer to the problem and the test specified in the previous problem. Enter the data into an Excel worksheet. Then carry out the test to see whether the aerobic exercise raises heart rate significantly. The absolute value of the test statistic is

(a) 1.09682 (b) 1.5947 (c) 1.8942 (d) 2.09682 **(e) 3.644**

10. The p-value of the test in Question 8 is

(a) **0.0109** (b) 0.0734 (c) 0.1523 (d) 0.3046 (e) 0.3595

11. Refer to Question 8. A 95% confidence interval for the increase in heart rate due to the aerobic exercise is

(a) 9±4.5275 (b) 9±5.9316 (c) 9±6.2681 **(d) 9±6.8573** (e) 9±11.6296

12. Suppose that resting heart rate in the population in Question 8 follows a normal distribution with the mean 80 and standard deviation 5. The fraction of subjects in the population with the resting heart rate exceeding 85 is approximately

(a) 0.1587 (b) 0.1959 (c) 0.2356 (d) 0.2869 (e) 0.3672

13. Refer to Question 12. Suppose a random sample of 10 subjects from the population was obtained. What is the probability that at least two subjects in the sample have heart rate exceeding 85?

(a) 0.0251 (b) 0.4331 (c) 0.4742 **(d) 0.4871** (e) 0.5275

The table displayed below gives data on the weights (in pounds) and heights (in inches) for eleven members of a football team.

Height	70	71	71	71	72	72	73	74	75	76	74
Weight	181	160	181	201	179	182	180	200	197	205	194

Enter the data in an Excel worksheet. Make sure that you have entered the correct data. Then use the *Regression* output for the data to complete the sentences in Questions 12-16.

14. The value of the correlation coefficient between the height and weight is

(a) 0.5327 **(b) 0.6441** (c) 0.6710 (d) 0.8942 (e) 0.9131

15. The equation of the least-squares regression line of weight on height is

(a) Weight = 4.4901*Height - 138.8682
(b) Weight = 1.7777*Height + 129.1651
(c) Weight = 6.7763* Height - 139.405
(d) Weight = 1.7777*Height + 129.1651
(e) Weight = 5.2517*Height + 121.7426

16. What would be the weight predicted by the regression line for a player who is 71 inches in height?

(a) 175.4353 **(b) 179.9254** (c) 184.4154 (d) 186.3254 (e) 188.6324

17. One of the players is 71 inches in height and weighs 201 lbs. What is the value of the residual corresponding to this case?

(a) 5.5647 (b) -19.9254 (c) 1.0746 **(d) 21.0746** (e) 4.8435

18. What fraction of the variation in weights is explained by the regression of weights on height?

(a) 41.48% (b) 48.56% (c) 51.34% (d) 58.23% (e) 64.41%