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PART II: Questions 11 – 25, Self select Fall 2006

Choose TEN out of the next FIFTEEN questions to complete. You must show all your work and clearly indicate your answer for full credit. CROSS OUT the problems that you do not want graded.

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Use the confidence level and sample data to find a confidence interval for estimating the population mean.

11) 35 packages are randomly selected from packages received by a parcel service. The sample has a mean weight of 26.7 pounds and a standard deviation of 2.9 pounds. What is the 95 percent confidence interval for the true mean weight of all packages received by the parcel service?

Find the indicated probability.

12) A sample of 4 different calculators is randomly selected from a group containing 17 that are defective and 36 that have no defects. What is the probability that at least one of the calculators is defective?

Use the given degree of confidence and sample data to find a confidence interval for the population standard deviation. Assume that the population has a normal distribution.

13) To find the standard deviation of the diameter of wooden dowels, the manufacturer measures 19 randomly selected dowels and finds the standard deviation of the sample to be 0.16. Find the 95% confidence interval for the population standard deviation.

Find the mean of the data summarized in the given frequency distribution.

14) The test scores of 40 students are summarized in the frequency distribution below. Find the mean score.

Score	Students
50–59	5
60–69	12
70–79	5
80–89	5
90–99	13

Find the indicated probability.

15) A sample of 100 wood and 100 graphite tennis rackets are taken from the warehouse. If 5 wood and 17 graphite are defective and one racket is randomly selected from the sample, find the probability that the racket is wood or defective.

Find the best predicted value of y corresponding to the given value of x. Use a 5% significance level.

16) Six pairs of data yield r = 0.444 and the regression equation $\hat{y} = 5x + 2$. Also, $\bar{x} = 6.7$ and $\bar{y} = 18.3$. What is the best predicted value of y for x = 5?

Find the indicated probability.

17) A test consists of 10 true/false questions. If a student guesses on each question, what is the probability that the student will get exactly 7 questions right?

Test the given claim using the traditional method of hypothesis testing. Identify the null hypothesis, alternative hypothesis, the critical value(s), test statistic, conclusion about the null hypothesis, and final conclusion that addresses the original claim.

18) A large software company gives job applicants a test of programming ability and the mean for that test has been 160 in the past. Twenty−five job applicants are randomly selected from one large university and they produce a mean score and standard deviation of 164 and 12, respectively. Use a 0.05 level of significance to test the claim that this sample comes from a population with a mean score greater than 160.

Solve the problem.

19) According to a college survey, 28% of all students work full time. Find the mean and the standard deviation for the number of students who work full time in samples of size 22.

Use the given data to find the equation of the regression line. Round the final values to three significant digits, if necessary.

20)

x	1	3	5	7	9
y	143	116	100	98	90

Solve the problem.

21) A final exam in Math 160 has a mean of 73 with standard deviation 7.8. If 24 students are randomly selected, find the probability that the mean of their test scores is greater than 71.

Explain using complete sentences.

22) A student has a data set in which the smallest value is 74.1 and the largest value is 76.7. When attempting to calculate the standard deviation of this data, the student got the number s = 22.31. Use complete sentences to explain how the student should know that this standard deviation is incorrect.

Solve the problem.

23) A class has 8 students who are to be assigned seating by lot. What is the probability that the students will be arranged in order from shortest to tallest? (Assume that no two students are the same height.)

Find the variance and standard deviation for the given set of seven sample data values. Round your answer to one more decimal place than the original data.

24) 10.8, 17.6, 18.2, 13.0, 13.9, 15.2, 11.3

Test the given claim using the P–value method of hypothesis testing. Identify the null hypothesis, alternative hypothesis, test statistic, P–value, conclusion about the null hypothesis, and final conclusion that addresses the original claim.

25) In a sample of 167 children selected randomly from one town, it is found that 37 of them suffer from asthma. At the 0.05 significance level, test the claim that the proportion of all children in the town who suffer from asthma is 11%.

11) $t_{\alpha/2} = 2.032$, $25.7 < \mu < 27.7$
12) 0.799
13) $0.12 < \sigma < 0.24$
14) 76.8
15) 0.585
16) 18.3
17) 0.117
18) Test statistic: t = 1.667. Critical value: t = 1.711. Fail to reject the null hypothesis. There is not sufficient sample evidence to support the claim that the mean is greater than 160.
19) $\mu = 6.16$, $\sigma = 2.11$
20) $\hat{y} = 140.4 - 6.2x$
21) 0.8962
22) Answers may vary. Most notably the range is only 2.6, therefore using the range rule of thumb the standard deviation should be approximately 0.65. A standard deviation of 22.31 is way too large.
23) $\frac{1}{8!}$ or 2.48×10^{-5} or 0.0000248
24) $s^2 = 8.33$, $s = 2.89$
25) H_0: $p = 0.11$. H_1: $p \neq 0.11$. Test statistic: z = 4.61. P−value: p = 0.0002.
Reject null hypothesis. There is sufficient evidence to warrant rejection of the claim that the proportion of all children in the town who suffer from asthma is 11%.