**5.1.** Suppose that hourly wages in the petroleum industry in Texas are normally distributed with a mean of $17.60 and a standard deviation of $1.30. A large company in this industry randomly sampled 50 of its workers, determining that their hourly wage was $17.30. Stating your assumptions, can we conclude that this company’s average hourly wage is below that of the entire industry?

Mu = 17.60

Sd = 1.3

N = 50

H0 = 17.30

**5.2.** The mean age of accounts payable has been 22 days. During the past several months, the firm has tried a new method to reduce this mean age. A simple random sample of 200 accounts payable last month had mean age 20.2 days and standard deviation 7.2 days. Use a confidence interval to determine if the new method has

made a difference.

Mu = 20.2

N = 200

Sd = 7.2

CI =

**5.3.** The Security and Exchange Commission (SEC) requires companies to file annual reports concerning their financial status. Firms cannot audit every account receivable, so the SEC allows firms to estimate the true mean. They require that a reported mean must be within $5 of the true mean with 98% confidence. In a small

sample of 20 from firm Y, the sample standard deviation was $40. What must the total sample size be so that the audit meets the standard of the SEC?

mu = 5

CI = 98

N = 20

Sd = 40

**5.4.** The Kansas City division of a company produced 982 units last week. Of these, 135 were defective. During this same time period, the Detroit division produced 104 defectives out of 1,088 units. Test whether he two divisions differed significantly in their tendency to produce defectives.

135/982

104/1088

Test significance

**5.5.** A human resources manager is interested in the proportion of firms in the United States having on-site day-care facilities. What is the required sample size to be 90% certain that the sample proportion will be within 5% of the unknown population proportion?

N find

CI = 90

????

**5.6.** A health insurance company now offers a discount on group policies to companies having a sufficiently high percentage of nonsmoking employees. Suppose a company with several thousand workers randomly samples 200 workers and finds that 186 are nonsmokers. Find a 95% confidence interval for the proportion of this company’s employees who do not smoke.

sample = 200

Nonsmokers = 186

CI = 95

**5.7.** Out of 750 people chosen at random, 150 were unable to identify your product. Find a 90% confidence interval for the proportion of all people in the population who will be unable to identify your product.

Sample = 750

N = 150

CI = 90

**5.9.** Two hundred people were randomly selected from the adult population of each of two cities. Fifty percent of the city #1 sample and 40% of the city #2 sample were opposed to legalization of marijuana. Test the two-sided hypothesis that the two cities have equal proportions of citizens who favor legalization of marijuana. (Calculate and interpret the *p*-value.)

N= 200

S1=50

S2=40

**5.10.** A random sample of 200 people revealed that 80 oppose a certain bond issue. Find a 90% confidence interval for the proportion in the population who oppose this bond issue. Work the arithmetic down to a final numerical answer.

Sample = 200

N = 80

CI = 90

**5.11.** The confidence interval answer to the previous question is rather wide. How large a sample would have been required to reduce the confidence interval error margin to 0.02?

**5.12.** Random samples of 400 voters were selected in both New Jersey and Pennsylvania.

There were 210 New Jersey respondents and 190 Pennsylvania respondents who stated that they were leaning toward supporting the Democratic nominee for President. Test the claim (alternative hypothesis) that the proportion of all New Jersey voters who lean Democratic exceeds the proportion of all Pennsylvania voters who lean Democratic.

a. Set up *H*0 and *H*1.

b. Calculate ˆ*p*1, ˆ*p*2, and ˆ*p*.

c. Calculate *z*calc.

d. Approximate the *p*-value.

e. State your conclusion concerning the claim.