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| **Описание: logo_unec**  **AZƏRBAYCAN DÖVLƏT İQTİSAD UNİVERSİTETİ** |
| **BEYNƏLXALQ İQTİSADİYYAT MƏKTƏBİ** |
| **BEYNƏLXALQ İQTİSADİYYAT (İNGİLİS DİLLİ) KAFEDRASI**  Fənn: Statistika  Müəllim: İbrahim İbrahimov  Qrup: 1082  **İMTAHAN SUALLARI** |

**1. Determine an appropriate interval width for a random sample of 110 observations that fall between and include each of the following:**

a.20 to 85

b.30 to 190

c.40 to 230

d.140 to 500

**2. Consider the following data:**

17 62 15 65

28 51 24 65

39 41 35 15

39 32 36 37

40 21 44 37

59 13 44 56

12 54 64 59

a. Construct a frequency distribution.

b. Construct a histogram and interpret your result.

c. Construct an ogive and interpret your result.

d. Construct a stem-and-leaf display and interpret your result.

**3. The following table shows the ages of competitors in a charity tennis event in Rome:**

**Age Percent**

18–24 18.26

25–34 16.25

35–44 25.88

45–54 19.26

55+ 20.35

a. Construct a relative cumulative frequency distribution.

b. What percent of competitors were under the age of 35?

c. What percent of competitors were 45 or older?

**4. Consider the following frequency distribution:**

Class Frequency

0 < 10 8

10 < 20 10

20 < 30 13

30 < 40 12

40 < 50 6

a. Construct a relative frequency distribution.

b. Construct a cumulative frequency distribution.

c. Construct a cumulative relative frequency distribution and interpret your result.

**5. A sample of 20 financial analysts was asked to provide forecasts of earnings per share of a corporation for next year. The results are summarized in the following table:**

Forecast ($ per share) Number of Analysts

9.95 < 10.45 2

10.45 < 10.95 8

10.95 < 11.45 6

11.45 < 11.95 3

11.95 < 12.45 1

a. Construct the histogram and interpret your result.

b. Determine the relative frequencies and interpret your result.

c. Determine the cumulative frequencies.

d. Determine and interpret the relative cumulative frequencies.

**6. The time (in seconds) that a random sample of employees of two companies took to complete a task is:**

|  |  |  |
| --- | --- | --- |
|  | **Companies** | |
| **Number of workers** | **Company 1** | **Company 2** |
| **1** | **10** | **16** |
| **2** | **15** | **18** |
| **3** | **10** | **14** |
| **4** | **30** | **14** |
| **5** | **12** | **10** |
| **6** | **16** | **8** |
| **7** | **18** | **20** |
| **8** | **10** | **22** |

a**.** Compute mean, median, and mode for both companies.

b. Explain the differences, what do they mean.

c. Which measure of central tendency best describes the data? and why?

d. Find the standard deviation and coefficient of variation for both and interpret the result economically.

e. Compare and comment on standard deviation and coefficient of variation.

g. Interpret the results economically. (What does this relation economically mean)

**7. This question refers to question (1).**

a. Find all three quartiles for both.

b. Find Interquartile range for both.

c. Find the five-number summary for both .

**8. The following data give X, the price charged per piece of table, and Y, the quantity sold (in thousands)**

Price per Piece (X) Thousands of Pieces Sold (Y)

$8 80

9 60

10 50

11 40

12 0

a. Calculate mean, variance and standard deviation for the both variables.

b. Compute covariance and correlation coefficient.

c. Comment on strength and direction of relationship between the two variables.

d. Interpret the results economically. (What does this relation economically mean).

e. Comment on strength and direction of relationship between the two variables.

**9. A random sample of data has a mean of 75 and a variance of 25.**

a. Use Chebyshev’s theorem to determine the percent of observations between 65 and 85.

b. If the data are mounded, use the empirical rule to find the approximate percent of observations between 65 and 85.

**10. Following is a random sample of seven (x, y) pairs of data points:**

(1,5), (3,7), (4,6), (5,8), (7,9), (3,6), (5,7)

a. Compute the covariance.

b. Compute the correlation coefficient.

**11. Consider the following sample of five values and corresponding weights:**

***xi wi***

4.6 8

3.2 3

5.4 6

2.6 2

5.2 5

a. Calculate the arithmetic mean of the *xi* values without weights.

b. Calculate the weighted mean of the *xi* values.

**12. Construct a stem-and-leaf display for the hours that 20 students spent studying for a marketing test.**

3.5 2.8 4.5 6.2 4.8 2.3 2.6 3.9 4.4 5.5

5.2 6.7 3.0 2.4 5.0 3.6 2.9 1.0 2.8 3.6

**13. A team of undergraduate business students was asked to recommend improvement to the data entry process at the county appraiser’s office. The team identified several types of errors, such as posting an incorrect name or entering an incorrect parcel number. The deed abstractors were asked to keep a record of the errors in data entry that were sent to them. The following table is a frequency distribution of errors:**

Defect Total

Posting error in name 23

Posting error in parcel 21

Property sold after tax bills were mailed 5

Inappropriate call transfer (not part of deeds> 18

mapping)

Posting error in legal description>incomplete 4

legal description

Deeds received after tax bills printed 6

Correspondence errors 2

Miscellaneous errors 1

a. Construct a Pareto diagram of these defects in data

entry and demonstrate your understanding on Pareto diagram.

b. What recommendations would you suggest to the

county appraiser?

1. **Consider the following data:**

**20, 68, 15, 65, 28, 51, 24, 65, 39, 77, 68, 15, 39, 20, 37, 40, 21, 77, 37, 77, 68, 77, 20, 54, 64**

a. Determine interval width and boundaries. (number of classes is 5)

b. Construct a frequency distribution.

c. Draw a histogram

d. Draw an Ogive

e. Draw a stem-and-leaf display

**15. Consider the following frequency distribution:**

|  |  |
| --- | --- |
| **Class** | **Frequency** |
| **0 − 20** | **4** |
| **20 − 40** | **2** |
| **40 − 60** | **12** |
| **60 − 80** | **8** |
| **80 − 100** | **6** |

a. Construct a relative frequency distribution

b. Construct a cumulative frequency distribution.

c. Construct a cumulative relative frequency distribution.

d. Interpret the relative cumulative frequencies.

1. **A company has determined that there are seven possible defects for one of its product lines. Construct a Pareto diagram for the following defect frequencies:**

Defect Code Frequency

A 10

B 70

C 15

D 90

E 8

F 4

G 3

1. **Describe the following random sample of 10 final exam grades for an introductory**

**accounting class with a stem-and-leaf display.**

88 51 63 85 79 65 79 70 73 77

1. **In one region it was found that 28% of people with incomes less than $50,000 use the Internet; 48% of those with incomes between $50,000 to $74,999 use the Internet and 70% of those with incomes of at least $75,000 use the Internet. Use a pie chart or a bar chart to plot this data.**
2. **The demand for bottled water increases during the hurricane season in Florida. The**

**number of 1-gallon bottles of water sold for a random sample of n = 12 hours in one**

**store during hurricane season is:**

60 84 65 67 75 72 80 85 63 82 70 75

**Describe the central tendency of the data.**

1. **Find the mean, median, and mode for a random sample of eight U.S. corporations with**

**the following percentage changes in earnings per share in the current year compared**

**with the previous year:**

0% 0% 8.1% 13.6% 19.4% 20.7% 10.0% 14.2%

1. **Demonstrate your understanding on Percentiles and Quartiles.**

**22. The demand for bottled water increases during the hurricane season in Florida. The**

**number of 1-gallon bottles of water sold for a random sample of *n* = 12 hours in one**

**store during hurricane season is:**

60 84 65 67 75 72 80 85 63 82 70 75

**Find the five-number summary.**

1. **A department-store manager is interested in the number of complaints received by the customer-service**

**department about the quality of electrical products sold by the store. Records over a 5-week period show**

**the following number of complaints for each week:**

13 15 8 16 8

a**. Compute the mean number of weekly complaints.**

**b. Calculate the median number of weekly complaints.**

**c. Find the mode**.

1. **During the last 3 years Consolidated Oil Company expanded its gasoline stations into convenience food**

**stores (CFSs) in an attempt to increase total sales revenue. The daily sales (in hundreds of dollars)**

**from a random sample of 10 weekdays from one of its stores are:**

6 8 10 12 14 9 11 7 13 11

a. **Find the mean, median and mode for this store.**

**b. Find the five-number summary.**

1. **Consider a very large number of students taking a college entrance exam such as the**

**SAT. And suppose the mean score on the mathematics section of the SAT is 570 with a**

**standard deviation of 40.**

a. Find the z-score for a student who scored 600.

b. A student is told that his z-score on this test is -1.5. What was his actual SAT

math score?

1. **Compute the standard deviation and coefficient of variation** **of the following sample data. Compare and interpret your findings:**

6 8 7 10 3

1. 8 11 7 9
2. **S = [E1, E2, E3, E4, E5, E6, E7, E8, E9, E10]**

**Given A = [E1, E3, E7, E9] and B = [E2, E3, E8, E9].**

a. What is A intersection B?

b. What is the union of A and B?

c. Is the union of A and B collectively exhaustive?

27**. A corporation takes delivery of some new machinery that must be installed and checked before it becomes available to use. The corporation is sure that it will take no more than 7 days for this installation and check to take place. Let A be the event “it will be more than 4 days before the machinery becomes available” and B be the event “it will be less than 6 days before the machinery becomes available.”**

a. Describe the event that is the complement of event A.

b. Describe the event that is the intersection of events A and B.

c. Describe the event that is the union of events A and B.

d. Are events A and B mutually exclusive?

e. Are events A and B collectively exhaustive?

f. Show that (A ᴖ B) ᴗ (Ā ᴖ B) = B.

1. **With the following four basic outcomes for the Dow Jones Industrial Average over two consecutive days:**

***O*1: The Dow Jones average rises on both days.**

***O*2: The Dow Jones average rises on the first day but does not rise on the second day.**

***O*3: The Dow Jones average does not rise on the first day but rises on the second day.**

***O*4: The Dow Jones average does not rise on either day.**

**Let events A and B be the following:**

A: The Dow Jones average rises on the first day.

B: The Dow Jones average rises on the second day.

a. Show that (A ᴖ B) ᴗ (Ā ᴖ B) = B.

b. Show that A ᴗ (Ā ᴖ B) = A ᴗ B.

|  |  |  |  |
| --- | --- | --- | --- |
| 1. **4. Question on Conditional probability.**   **Before books aimed at preschool children are marketed, reactions are obtained from a panel of preschool children. These reactions are categorized as “favorable,” “neutral,” or “unfavorable”. Subsequently, book sales are categorized as “high,” “moderate,” or “low,” according to the norms of this market. Similar panels have evaluted 1,000 books in the past. The accompanying table shows their reactions and the resulting market performance of the books.**  Panel Reaction | | | |
| Sales | *Favorable* | *Neutral* | *Unforable* |
| *High* | 173 | 101 | 61 |
| *Moderate* | 88 | 211 | 70 |
| *Low* | 42 | 113 | 141 |

a. If the panel reaction is favorable, what is the probabaility that sales will be high?

b. If the panel reaction is unforable, what is the probabaility that sales will be low?

c. If the panel reaction is neuytral or better, what is the probability that sales will be low?

1. **A department store manager has monitored the number of complaints received per week about poor service. The probabilities for numbers of complaints in a week, established by this review, are shown in the following table. Let *A* be the event “There will be at least 1 complaint in a week” and *B* the event “There will be less than 10 complaints in a week.”**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Number of complaints | 0 | 1 to 3 | 4 to 6 | 7 to 9 | 10 to 12 | More than 12 |
| Probability | 0.14 | 0.39 | 0.23 | 0.15 | 0.06 | 0.03 |

a. Find the probability of A and B.

b. Find the probability of the Complement of A and B.

c. Find the probability of union and intersaction of A and B.

d. Are the events mutually exlusive? Calculate and explain

e. Are the events A and B collectively exhaustive? Calculate and explain

1. **Product Selection (Addition Rule)**

A cell phone company found that 75% of all customers want text messaging on their

phones, 80% want photo capability, and 65% want both. What is the probability that a

customer will want at least one of these?

1. **Question (conditional probability )**

In previous example we noted that 75% of the customers want text messaging, 80% want

photo capability, and 65% want both. What are the probabilities that a person who

wants text messaging also wants photo capability and that a person who wants photo

capability also wants text messaging?

1. **Question (statistically independent )**

Suppose that women obtain 54% of all bachelor’s degrees in a particular country and

that 20% of all bachelor’s degrees are in business. Also, 8% of all bachelor’s degrees

go to women majoring in business. Are the events “the bachelor’s degree holder is a

woman” and “the bachelor’s degree is in business” statistically independent?

1. **Question (Bayes Theorem)**

AhmedX, a major electronics distributor, has hired Southwest Forecasters, a

market research firm, to predict the level of demand (Low (L), Moderate (M) and High (H)) for its new product that combines cell phone and complete Internet capabilities at a price substantially below its major competitors. As part of its deliverables, Southwest provides a rating of Poor (P), Fair (F) or

Good(G), on the basis of its research. Prior to engaging Southwest Blue Star, management

concluded the following probabilities for the market-demand levels:

P(L)=0.5, P(P\L)=0.4, P(P\M)=0.3, P(M)=0.2, P(P\H)=0.5, P(H)=0.6

Using Bayes theorem and probability rules (where needed) find the probability of P (L\P).

1. **Given P(A1) = 0.4, P(B1\A1)= 0.6, P(B1\A2)= 0.7, P(A1\B1) ?**
2. **The sample space contains 5 As and 7 Bs. What is the probability that a randomly selected set of 2 will include 1 A and 1 B?**
3. **A corporation has just received new machinery that must be installed and checked before it becomes operational. The accompanying table shows a manager’s probability assessment for the number of days required**

**before the machinery becomes operational.**

**Number of days 3 4 5 6 7**

**Probability 0.08 0.24 0.41 0.20 0.07**

**Let *A* be the event “it will be more than four days before the machinery becomes operational,” and let *B* be**

**the event “it will be less than six days before the machinery becomes available.”**

a. Find the probability of event *A*.

b. Find the probability of event *B*.

c. Are events A and B mutually exclusive?

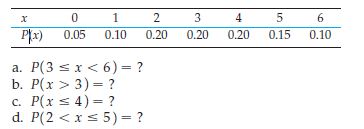
d. Are events A and B collectively exhaustive?

e. Find the probability of the intersection of events *A* and *B*.

1. **The probability of A is 0.60, the probability of B is 0.45, and the probability of either is 0.80. What is the probability of both A and B?**
2. **Namin, the account manager for Apple Securities, has a portfolio that includes 20 shares of Allied Information Systems and 30 shares of Bangalore Analytics. Both firms provide Web-access devices that compete in the consumer market. The price of Allied stock is normally distributed with mean E(X)= 25 and variance VAR(X) = 81. The price of Bangalore stock is also normally distributed with the mean E(Y) = 40 and the VAR(Y) = 121. The stock prices have a negative correlation, rXY= -0.40.**

Namin has asked you to determine the return (mean) and risk (standard.deviation) of this portfolio and interpret your results.

1. **The profit for a production process is equal to $1,000 minus two times the number of units produced. The mean and variance for the number of units produced are 50 and 90, respectively. Find the mean and variance of the profit.**
2. **Summary of Properties for Linear Functions of Random Variables (page 155)**
3. **The number of computers sold per day at Dan’s Computer Works is defined by the following probability distribution:**



**42. Consider the probability distribution function.**

**x 0 1**

**Probability 0.40 0.60**

a. Graph the probability distribution function.

b. Calculate and graph the cumulative probability distribution.

c. Find the mean of the random variable X.

d. Find the variance of X.

1. **An automobile dealer calculates the proportion of new cars sold that have been returned a various numbers of times for the correction of defects during the warranty period. The results are shown in the following table.**

**Number of returns 0 1 2 3 4**

**Proportion 0.28 0.36 0.23 0.09 0.04**

a. Graph the probability distribution function.

b. Calculate and graph the cumulative probability

distribution.

c. Find the mean of the number of returns of an

automobile for corrections for defects during the

warranty period.

d. Find the variance of the number of returns of an automobile

for corrections for defects during the warranty

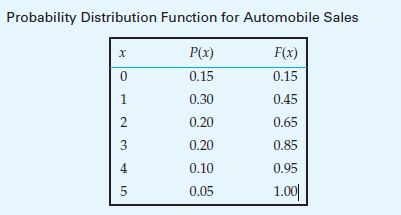
period.

1. **Suppose that the probability distribution for the number of errors, X, on pages from**

**business textbooks is as follows:**

**P(0) = 0.81 P(1) = 0.17 P(2) = 0.02**

Find the mean number of errors per page.

1. **The number of Prius cars sold daily could vary from 0 to 5, with the probabilities given in Table below**.

Find the expected value and variance for this probability distribution.

1. **A contractor is interested in the total cost of a project on which she intends to bid.She**

**estimates that materials will cost $25,000 and that her labor will be $900 per day. If the**

**project takes *X* days to complete, the total labor cost will be 900*X* dollars, and the total**

**cost of the project (in dollars) will be as follows:**

***C* = 25,000 + 900*X***

**Using her experience the contractor forms probabilities (See the table) of likely completion times for the project.**

**COMPLETION TIME x (DAYS) 10 11 12 13 14**

**Probability 0.1 0.3 0.3 0.2 0.1**

a. Find the mean and variance for completion time *X*.

b. Find the mean, variance, and standard deviation for total cost *C*.

1. **Shirley Ferguson, an insurance broker, believes that for a particular contact the probability of making a sale is 0.4. If the random variable X is defined to take the value 1 if a sale is made and 0 otherwise, then X has a Bernoulli distribution with probability of success P equal to 0.4.**

Find the mean and the variance of the distribution.

1. **Demonstrate your understanding on the Poisson Distribution Function, Mean, and Variance ( 3 slides)**
2. **Customers arrive at a photocopying machine at an average rate of 2 every five minutes.**

**Assume that these arrivals are independent, with a constant arrival rate, and that this**

**problem follows a Poisson model, with X denoting the number of arriving customers**

**in a 5-minute period and mean l = 2.**

Find the probability that more than two customers arrive in a 5-minute period.

24. **Suppose that Charlotte King has two stocks, A and B. Let *X* and *Y* be random variables**

**of possible percent returns (0%, 5%, 10%, and 15%) for each of these two stocks, with**

**the joint probability distribution given in Table 4.7.**

a. Find the marginal probabilities.

b. Determine if *X* and *Y* are independent.

1. **Summary Results for Linear Sums and Differences of Random Variables (page 184)**
2. **A random variable *X* is normally distributed with a mean of 100 and a variance of 100, and a random variable *Y* is normally distributed with a mean of 200 and a variance of 400. The random variables have a correlation coefficient equal to -0.5.**

Find the mean and variance of the random variable:

*W* = 5*X* + 4*Y*

**51. A random sample of eight homes in a particular suburb had the following selling prices (in thousands of dollars):**

192 183 312 227 309 396 402 390

a. Assume nonnormality and find a point estimate of the population mean that is unbiased and efficient.

b. Use an unbiased estimation procedure to find a point estimate of the variance of the sample

mean. (*Hint*: Use sample standard deviation to

estimate population standard deviation).

c. Use an unbiased estimator to estimate the proportion of homes in this suburb selling for less than $250,000.

**52. Suppose that *x*1 and *x*2 are random samples of observations from a population with mean µ and variance *s*2. Consider the following three point estimators, *X*, *Y*,**

***Z*, of µ:**

X= Y= Z=

a. Show that all three estimators are unbiased.

b. Which of the estimators is the most efficient?

c. Find the relative efficiency of *X* with respect to each of the other two estimators.

**53. The Mendez Mortgage Company case study was introduced in Chapter 2. A random sample**

**of *n* = 350 accounts of the company’s total portfolio is stored in the data file Mendez Mortgage.**

**Consider the variable “Original Purchase Price.” Use unbiased estimation procedures to find point estimates of the following:**

a. The population mean

b. The population variance

c. The variance of the sample mean

d. The population proportion of all mortgages

with original purchase price of less than

$10,000

**54. A random sample of 12 employees in a large manufacturing plant found the following figures for number of hours of overtime worked in the last month:**

**22 16 28 12 18 36 23 11 41 29 26 31**

**Use unbiased estimation procedures to find point estimates for the following:**

a. The population mean

b. The population variance

c. The variance of the sample mean

d. The population proportion of employees working more than 30 hours of overtime in this plant in the last month (*n* = 12 employees).

**55.** **A random sample of 16 junior managers in the offices of corporations in a large city center was taken to estimate average daily commuting time for all such managers. Suppose that the population times have a normal distribution with a mean of 87 minutes and a standard deviation of 22 minutes.**

a. What is the standard error of the sample mean commuting time?

b. What is the probability that the sample mean is fewer than 100 minutes?

c. What is the probability that the sample mean is more than 80 minutes?

d. What is the probability that the sample mean is outside the range 85 to 95 minutes?

**56. Find the reliability factor, *z*a/2, to estimate the mean,µ, of a normally distributed population with known**

**population variance for the following.**

a. 93% confidence level

b. 96% confidence level

c. 80% confidence level

**57.** Find the reliability factor, *z* α /2, to estimate the mean, µ, of a normally distributed population with known

population variance for the following.

a. α = 0.08

b. α /2 = 0.02

**58. Assume a normal distribution with known population variance. Calculate the margin of error to estimate the**

**population mean, m, for the following.**

a. 98% confidence level; *n* = 64; s2 = 144

b. 99% confidence level; *n* = 120; s = 100

Calculate the margin of error to estimate the population mean

**59. Assume a normal distribution with known population variance. Calculate the width to estimate the population mean, m, for the following.**

a. 90% confidence level; *n* = 100; s2 = 169

b. 95% confidence level; *n* = 120; s = 25

**60. Assume a normal distribution with known population variance. Calculate the LCL and UCL for each of the following.**

a. *x* = 50; *n* = 64; σ = 40; a = 0.05

b. *x* = 85; *n* = 225; σ2= 400; a = 0.01

c. *x* = 510; *n* = 485; σ = 50; a = 0.10

**61. It is known that the standard deviation in the volumes of 20-ounce (591-millliliter) bottles of natural spring water bottled by a particular company is 5 millliliters. One hundred bottles are randomly sampled and measured.**

a. Calculate the standard error of the mean.

b. Find the margin of error of a 90% confidence interval estimate for the population mean volume.

c. Calculate the LCL, UCL and the width for a 98% confidence interval for the population mean volume.

**62. A college admissions officer for an MBA program has determined that historically applicants have undergraduate grade point averages that are normally distributed with standard deviation 0.45. From a random sample of 25 applications from the current year, the sample mean grade point average is 2.90.**

a. Find a 95% confidence interval for the population mean.

b. Based on these sample results, a statistician computes for the population mean a confidence interval

extending from 2.81 to 2.99. Find the confidence level associated with this interval.

**63. Find the standard error to estimate the population mean for each of the following.**

a. *n* = 17; 95% confidence level; *s* = 16

b. *n* = 25; 90% confidence level; *s*2 = 43

**64.** Calculate the margin of error to estimate the population mean for each of the following (variance is unknown).

a. 99% confidence level;

*x*1 = 25; *x*2 = 30; *x*3 = 33; *x*4 = 21

b. 90% confidence level;

*x*1 = 15; *x*2 = 17; *x*3 = 13; *x*4 = 11; *x*5 = 14

**65. Find the LCL and UCL for each of the following.**

a. α = 0.05; *n* = 25; *x* = 560; *s* = 45

b. . α /2 = 0.05; *n* = 9; *x* = 160; *s*2 = 36

c. 1 - a = 0.98; *n* = 22; *x* = 58; *s* = 15

**66. A random sample of 16 tires was tested to estimate the average life of this type of tire under normal driving**

**conditions. The sample mean and sample standard deviation were found to be 47,500 miles and 4,200**

**miles, respectively.**

a. Calculate the margin of error for a 95% confidence interval estimate of the mean lifetime of this type of tire if driven under normal driving conditions.

b. Find the UCL and the LCL of a 90% confidence interval estimate of the mean lifetime of this type of tire if driven under normal driving conditions.

**67. Calculate the width for each of the following.**

a. *n* = 6; *s* = 40; . α = 0.05

b. *n* = 22; *s*2 = 400; α = 0.01

c. *n* = 25; *s* = 50; α = 0.10

**68. Find the margin of error to estimate the population proportion for each of the following.**

a. *n* = 350; *ϸ* = 0.30; . α = 0.01

b. *n* = 275; *ϸ* = 0.45; . α = 0.05

c. *n* = 500; *ϸ* = 0.05; . α = 0.10

**69. Calculate the confidence interval to estimate the population proportion for each of the following.**

a. 98% confidence level; *n* = 450; *ϸ* = 0.10

b. 95% confidence level; *n* = 240; *ϸ* = 0.01

c. a = 0.04; *n* = 265; *p*n = 0.50

**70. A business school placement director wants to estimate the mean annual salaries 5 years after students graduate. A random sample of 25 such graduates found a sample mean of $42,740 and a sample standard deviation of $4,780. Find a 90% confidence interval for the population mean, assuming that the population distribution is normal.**

**71. The production manager of Northern Windows, Inc., has asked you to evaluate a proposed**

**new procedure for producing its Regal line of double-hung windows. The present**

**process has a mean production of 80 units per hour with a population standard**

**deviation of σ= 8. The manager does not want to change to a new procedure unless**

**there is strong evidence that the mean production level is higher with the new process.**

**72. Demonstrate your understanding on interpretation of the Probability Value, or p-Value.**

**73. The production manager of Circuits Unlimited has asked for your assistance in analyzing**

**a production process. This process involves drilling holes whose diameters are**

**normally distributed with a population mean of 2 inches and a population standard**

**deviation of 0.06 inch. A random sample of nine measurements had a sample mean of**

**1.95 inches. Use a significance level of a = 0.05 to determine if the observed sample**

**mean is unusual and, therefore, that the drilling machine should be adjusted.**

**74. A random sample is obtained from a population with variance σ2 = 625, and the sample mean is computed.**

**Test the null hypothesis *H*0 : µ = 100 versus the alternative hypothesis *H*1 : µ ›100 with α = 0.05. Compute**

**the critical value *xc* and state your decision rule for the following options.**

a. Sample size *n* = 25

b. Sample size *n* = 16

c. Sample size *n* = 44

d. Sample size *n* = 32

**75. Demonstrate your understanding on Unbiased Estimator, Most Efficient Estimator and Relative Efficiency**