Q1(12 pts) One hundred shoppers at a local shopping mall were categorized by age and gender, as shown in frequency distribution below.

Gender	Under 25 years (A)	25 – 40 years (B)	Over 40 years (C)
Male(M)	15	13	12
Female (F)	24	18	18

Calculate following probabilities showing complete work and formulas used.

(a) One shopper is selected at random from that group of 100 shoppers. What is the Probability the randomly selected shopper is 25 – 40 years of age.

(b) What is the probability that randomly selected shopper is female?

(c) What is the probability that randomly selected shopper is female and under 25 years of age?

(d) If randomly selected shopper is under 25 years of age, what is the probability that shopper is male?

(e) What is the probability that randomly selected shopper is female or over 40 years of age?

(f) If the randomly selected shopper is female what is the probability that she is 25 to 40 years old.

(g) Is the gender of the shopper and age mutually exclusive events? Explain

Q2 (6pts) A normal random variable x has an unknown mean, μ and standard deviation of $\sigma = 2.5$. If the probability that x exceeds 7.5 is 0.8289, find mean μ.

Q3 (8 pts) For a binomial experiment with n= 20 and p = 0.5

Calculate P ($0.6 \leq \hat{p} \leq 0.8$)

(a) Using binomial table.

(b) Using the normal approximation to the sampling distribution of $\hat{p}$

Q4 (8pts).An agricultural economist is interested in determining the average length of carrots produced in a particular farm. A random sample of n = 25 carrot is taken and the sample mean $\bar{x}$ is calculated, suppose that the average length of carrots on this farm is known from previous years production to be $\mu = 20$ cm with $\sigma = 3$ cm.

(a) What is the probability that the sample mean $\bar{x}$ exceeds 22 cm.

(b)What is the probability that sample mean is between 19 and 21.

Q5(8 points) Construct a box plot for the data and look for outliers.

340, 300, 520, 340, 320, 290, 260, 330

Q6 (6pts) Identify the following variables as quantitative or qualitative. If the variable

is quantitative, indicate whether it is continuous or discrete.

a) The cost of a model of Toyota sedan for sale in Southern California in 2005 .

b) The response from an applicant for a credit card when asked if he or she has an outstanding bank loan.

c.) The 2004 domestic sales for an electronic firm.

d) The number of potential voters in a sample of 100 potential voters who would vote to dismantle affirmative action procedures.

Q7 (6pts).Given, the observations 7, 9, 10, 6, 8, 7, 8, 9, 8,

Calculate the median and the standard deviation. Show all tables and formulas used.

Q8 (12 pts) For a binomial random variable with n = 20 and p = .3, fill in the blanks.

The problem	**List values of x**	**Write the probability**	**Rewrite the probability**	**Find the probability**
Exactly 2		p( )		
More than 2		p( )		
Two or less		p( )		

Q9 (6pts). Six people are being considered for three awards, and no person can receive more than one award.

a. In how many ways can these awards be given?

b. If 3 of these people are city officials, in how many ways could the awards be given to these officials?

c. If all candidates are equally qualified for the three awards, what is the probability that the awards will be presented to the three city officials.

Q10 (8 pts)True/ false questions

(a) Statistical inference is the process of making an estimate , prediction or decision about a population based on sample data .

(b) A branch of statistics discipline that is used to develop and utilize techniques for effectively presenting numerical information is called inferential statistics.

(c) A relative frequency distribution is a tabular summary of a data set showing the proportions of all observations that fall into each of several mutually exclusive classes.

(d) Nonrandom samples can be described and also be used for making inference

(e) Numerical descriptive measures calculated from a sample are called statistics.

(f) The publisher of a news paper decides which articles will be submitted for the consideration of the Pulitzer Prize committee. This is an example of cluster sampling.

(g) A group of people who, in response to some general appeal, have selected themselves to participate in a survey is called a simple random sample.

(h) The shape of a normal distribution is determined by its mean μ only.

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