



Answer the following problems... assume any missing data

- (1-a) Explain the difference between qualitative and quantitative variables. Give an example of qualitative and quantitative variables.
- (1-b) Explain the difference between a sample and a population.
- (1-c) The weights of 40 male students at State University are recorded to the nearest pound as in the following table.
- Construct a frequency distribution table
 - Construct a histogram and a frequency polygon for the weight distribution
 - Draw the pie chart.

138	164	150	132	144	125	149	157
146	158	140	147	136	148	152	144
168	126	138	176	163	119	154	165
146	173	142	147	135	153	140	135
161	145	135	142	150	156	145	128

- (1-d) Listed below is the percent increase in sales for the MG Corporation over the last 5 years. What is the geometric mean annual percent increase in sales over the period?
 9.4%, 13.8, 11.7%, -11.9% and 14.7%
- (1-e) A data set consists of 83 observations. How many classes would you recommend for a frequency distribution?

- (2-a) The events A and B are mutually exclusive. Suppose $P(A)=0.30$ and $P(B)=0.20$. What is the probability of either A or B occurring? What is the probability that neither A nor B will happen?
- (2-b) A National Park Service survey of visitors to the Rocky Mountain region revealed that 50% visit Yellowstone Park, 40% visit the Tetons, and 35% visit both.
- What is the probability a vacationer will visit at least one of these attractions?
 - What is the probability 0.35 called?
 - Are the events mutually exclusive? Explain.
- (2-c) Compute the mean and variance of the following discrete probability distribution.

x	0	1	2	3
P(x)	0.2	0.4	0.3	0.1

(1-d) Ten timber beams were tested on a span of 4 ft by a single concentrated load at midspan. The Douglas fir beams were 2 by 4 in. in nominal section (actual section: 1.63 by 3.50 in.). The purpose of the study was to compare ultimate load and load allowable by building code (394 lb), to compare actual and calculated deflection ($E = 1,600,000$ psi), and to determine if a relationship exists between rigidity and ultimate strength.

Specimen	Deflection at working load, in.	Ultimate load, lb
1	0.160	1750
2	0.130	2350
3	0.155	2050
4	0.134	2100
5	0.135	1525
6	0.123	2000
7	0.168	1450
8	0.130	2100
9	0.150	1475
19	0.132	1675

- (i) Compute the sample mean and variance for each set of data.
- (ii) Compute the standard deviations and coefficients of variation.
- (iii) Plot the scatter diagram and compute the correlation coefficient.
- (iv) Pearson's coefficient of skewness
- (v) What are your conclusions based on the results?

(1-e) A structure is located in a region where tornado wind force must be considered in its design. Suppose that from the records of tornadoes for the past 20 years, the mean occurrence rate of tornadoes in the region is once every 10 years. Assume that the occurrence of tornadoes can be modeled as a Poisson process. If the structure is designed to withstand a tornado force with an allowable probability of damage of 20%, what is the probability that the structure will be damaged in the next 50 years?

With my best wishes

This exam measures the following ILOs						
Question Number	Q1(1-a)	Q1(1-b)	Q1(1-c), Q3(1-g)	Q1(1-e)	Q3(1-f)	Q1(1-h)
Skills	Q2(2-a)	Q4(1-d)	Q2(2-c)	Q2(2-b)	Q4(1-e)	Q2(2-d)
	Knowledge & understanding Skills			Intellectual Skills		Professional Skills