

CHAPTER: INTRODUCTION TO STATISTICS

1.1: DESCRIPTIVE STATISTICS

1. Three different items are sold at a fast-food restaurant - hotdogs, burgers and pizzas.

(a) Explain why the type of item sold is an example of a qualitative variables.

(b) Explain why the type of item sold is an example of a nominal scaled variables.

2. Supposed that you measure the time it takes to download a PDF file from the internet.

(a) Explain why the download time is a continuous quantitative variable.

(b) Explain why the download time is a ratio scaled variable.

3. The following information is collected from students upon exiting the campus bookstore during the first week of classes: If the variable is numerical, determine whether the variable is discrete or continuous. In addition, determine the level of measurement for these variables

(a) Amount of time spent shopping in the bookstore

(b) Number of textbooks purchased

(c) Academic major

(d) Gender

1.2: DESCRIBING DATA USING TABLES AND GRAPH

1. Nixon Corporation manufactures computer monitors. The following data are the numbers of computer monitors produced at the company for a sample of 30 days.

24 32 27 23 33 33 29 25 23 28 21 26 31 22 27 33 27 23 28 29 31 35 34 22 26 28 23 35 31 27

(a) Construct a frequency distribution table using the classes 21-23, 24-26, 27-29, 30-32, and 33-35.

(b) Calculate the relative frequencies and percentages for all classes.

(c) Construct a histogram and a polygon for the percentage distribution.

(d) For what percentage of the days is the number of computer monitors produced in the interval 27-29?

2. Thirty adults were asked which of the following conveniences they would find most difficult to do without: television (T), refrigerator (R), air conditioning (A), public transportation (P), or microwave (M). Their responses are listed below.

R A R P P T R M P A

A R R T P P T R A A

R P A T R P R A P R

(a) Prepare a frequency distribution table.

(b) Calculate the relative frequencies and percentages for all categories.

(c) What percentage of these adults named refrigerator or air conditioning as the convenience that they would find most difficult to do without?

(d) Draw a bar graph for the relative frequency distribution

1.2: NUMERICAL DESCRIPTIVE MEASURE

	Ungrouped	Grouped
Population Mean	$\mu = \frac{\sum x}{N}$	$\mu = \frac{\sum mf}{N}$
Sample Mean, \bar{x}	$\bar{x} = \frac{\sum x}{n}$	$\bar{x} = \frac{\sum mf}{n}$
Population Standard Deviation, σ	$\sigma = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{N}}{N}}$	$\sigma = \sqrt{\frac{\sum m^2 f - \frac{(\sum mf)^2}{N}}{N}}$
Sample Standard Deviation, s	$\sigma = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1}}$	$s = \sqrt{\frac{\sum m^2 f - \frac{(\sum mf)^2}{n}}{n-1}}$
Population and Sample Median	median=middle term	median class= $\left(\frac{n+1}{2}\right)^{th}$ term from CF Median $= LB_M + \left(\frac{N}{2} - CF_{M-1}\right) \frac{C_M}{f_M}$
Population and Sample Range	Range=LV- SV LV=Largest Value SV=Smallest Value	Range=LM- SM Largest Median=LM SM=Smallest Median
Interquartile Range (IQR)	IQR= $Q_3 - Q_1$	
Outlier (IQR)	$IQR \times 1.5 = A$ $Q_1 - A = B$ $Q_3 + A = C$ Outlier is any data which is less than B or greater than C	
Percentile	$P_k = \left(\frac{nk}{100}\right)^{th}$	
Percentile Rank	Percentile rank of x = $\frac{No.of\ data\ before\ x}{Total\ No.\ of\ data} \times 100\%$	
Chebyshev's Theorem	At least $\left(1 - \frac{1}{k^2}\right) \times 100\%$ of the data falls within k standard deviation	

1. The reported high temperatures (in degrees Fahrenheit) for selected world cities on an October day are shown below. Find the mean, median and mode for the data. Which measure of central tendency do you think best describes these data?

62 72 66 79 83 61 85 72 64 74

71 42 38 91 66 77 90 74 63 64

68 42 62

2. The following data give the number of all shoplifters apprehended during each of the past eight weeks at a large department store.

7 10 8 3 15 12 6 11

(a) Find the mean for these data.

(b) Calculate the range, variance, and standard deviation.

3. In a study of reaction times to a specific stimulus, a psychologist recorded these data (in seconds).

Class limits	Frequency
2.1 – 2.7	12
2.8 – 3.4	13
3.5 – 4.1	7
4.2 – 4.8	5
4.9 – 5.5	2
5.6 – 6.2	1

Find the mean, variance, and standard deviation.