Review Sheet for QBA 201, Quiz 1

1 Book Chapters Covered

Chapters 1 - 4

2 Topics Covered

- What is statistics?
- Different types of statistics:
  - Descriptive Statistics
  - Inferential Statistics
- Variable types:
  - Qualitative
  - Quantitative – Continuous and Discrete
- Four Levels of Measurement
  - Nominal Level
  - Ordinal Level
  - Interval Level
  - Ratio Level
- Frequency Table
- Relative Frequency Table
- Bar-chart
- Pie-chart
- Frequency Distribution (Interval or Ratio Data)
  - Determine the number of classes or bins (2^k rule)
  - Determine the width of the class or bin
  - Set the individual class limits
  - Tally the raw data into the classes or bins
  - Count the number of tallies in each class
- Relative Frequency Distribution
- Methods of displaying a frequency distribution:
  - Histogram
  - Frequency Polygon
  - Cumulative Frequency Distribution
- Measures of Central Tendency

  - Mean:
    * Population Mean: $\mu = \frac{\sum_i x_i}{N}$
    * Sample Mean: $\bar{x} = \frac{\sum_i x_i}{n}$
    * Weighted Mean: $\bar{x}_w = \frac{\sum_i w_i x_i}{\sum_i w_i}$
  - Median:
    * Found in the middle of the data at location: $L_{50} = (n+1)\frac{50}{100}$
    * Fifty percent of the values in the dataset are larger than the median.
  - Mode:
    * The most frequently occurring value in the dataset.
    * Can be more than one mode in the data.

- Measures of Dispersion
  - Range: $maximum - minimum$
  - Mean Absolute Deviation: $\frac{\sum_i |x_i - \bar{x}|}{n}$
  - Population Variance: $\sigma^2 = \frac{\sum_i (x_i - \bar{x})^2}{N}$
  - Sample Variance: $s^2 = \frac{\sum_i (x_i - \bar{x})^2}{n-1}$
  - Population Standard Deviation: $\sigma = \sqrt{\frac{\sum_i (x_i - \bar{x})^2}{N}}$
  - Sample Standard Deviation: $s = \sqrt{\frac{\sum_i (x_i - \bar{x})^2}{n-1}}$
- Chebyshev's Theorem (for any distribution)
- The Empirical Rule (for Normal distributions only)
- Dot Plots
- Quartiles and Deciles
- Box plots
- Measures of Skewness: Pearson's Skewness $= \frac{3(\bar{x} - median)}{s}$
- Scatter Diagram
- Contingency Table

3 Practice Exam

Answers for specific problems available upon request.

Problem 1, 15 points

For each of the following variables, identify the level of measurement.

(a) A marketing class of 50 students evaluated the instructor using the following scale: superior, good, average, poor, and inferior.

(b) The members of each basketball team wear numbers on their jerseys.

(c) Respondents were asked,"Do you now earn more than or less than you did five years ago?"

(d) The number of gallons of gasoline pumped by a filling station during a day.

(e) Centigrade temperature scale.

Problem 2, 10 points

Refer to the following breakdown of responses to a survey of room service in a hotel.

Response	Number of Respondents
Not Satisfied	20
Satisfied	40
Highly Satisfied	60

(a) What percent of responses indicate that the customer was satisfied?

(b) If you wished to show the relative frequencies, what type of chart would you use?

Problem 3, 25 points

A company's human resources department was interested in the average number of years that a person works before retiring. A sample with 10 elements was selected. The values recorded are as follows: 12, 16, 18, 19, 21, 21, 22, 24, 24, 35.

(a) Determine the number of classes that you would recommend for creating a frequency distribution. Show your work.

(b) What interval width would you recommend for this data?

(c) Write out the lower and upper limits of each class and put the appropriate count into the classes. Use as many or as few lines as you need.

Class	Lower Limit	Upper Limit	Count
1			
2			
3			
4			
5			
6			

(d) Construct a histogram.

(e) Construct a Cumulative Frequency Distribution Graph

Problem 4, 25 Points

A sample of five full-service gasoline stations was taken and the price per liter (to the nearest cent) was recorded, as follows: \$2.40, \$2.49, \$2.55, \$2.49, \$2.57.

(a) Find the Mean, Median, and Mode price for gasoline.

(b) Comment on the distribution of the data based on the mean and median.

(c) Calculate the standard deviation of this sample.

Price Per Liter	$(x_i - \bar{x})$	$(x_i - \bar{x})^2$
\$2.40		
\$2.49		
\$2.55		
\$2.49		
\$2.57		

(d) Calculate Pearson's Skew.

(e) Comment on the meaning of the skew that you calculated.

Problem 5, 25 points

The exam scores from a class of 15 are as follows: 45, 52, 58, 60, 65, 72, 75, 78, 82, 83, 83, 85, 86, 88, 90.

(a) Find the lower limit and the upper limit.

(b) Find the first quartile.

(c) Find the median.

(d) Find the third quartile.

(e) Construct a box plot and comment on the distribution of the data.