

**TD 1**  
**Descriptive Statistics**

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1. (a) The science of collecting, organizing, presenting, analyzing, and interpreting data to assist in making more effective decisions is referred to as **statistic**.
  - (b) Methods of organizing, summarizing, and presenting data in an enlightening way are called **descriptive statistic**
  - (c) The methods used to estimate a value of a population on the basis of a sample are called . **inferential statistic**
  - (d) A portion, or part, of the group of interest is referred to as a **sample**
  - (e) The entire set of individuals or objects of interest or the measurements obtained from all individuals or objects of interest is known as a . **population**
  - (f) With the ..... level of measurement, the data are sorted into categories with no particular order to the categories.
  - (g) The ..... level of measurement has a significant zero point.
  - (h) The.....level of measurement presumes that one classification is ranked higher than another.
  - (i) The .....level of measurement has the characteristic that the distance between values is a constant size.
  - (j) Is the number of bedrooms in a house a **discrete** or continuous variable? **bcuz we can count**
  - (k) The jersey numbers on baseball uniforms are an example of the ..... level of measurement.
  - (l) What level of measurement is used when students are classified by eye color?  
**nominal**
2. (a) A grouping of qualitative data into mutually exclusive classes showing the number of observations in each class is known as a **frequency table**
  - (b) A grouping of quantitative data into mutually exclusive classes showing the number of observations in each class is known as a **frequency**
  - (c) A graph in which the classes for qualitative data are reported on the horizontal axis and the class frequencies (proportional to the heights of the bars) on the vertical axis is called a .....
  - (d) A circular chart that shows the proportion or percentage that each class represents of the total is called a **pie chart**
  - (e) A graph in which the classes of a quantitative variable are marked on the horizontal axis and the class frequencies on the vertical axis is called a **histogram**
  - (f) A set of data included 70 observations. How many classes would you suggest to construct a frequency distribution?**7** .....
  - (g) The distance between successive lower class limits is called the .....
  - (h) The average of the respective class limits of two consecutive classes is the class **midpoint**
  - (i) In a relative frequency distribution, the class frequencies are divided by the .. **total number of observations**.

- (j) A cumulative frequency polygon is created by line segments connecting the class ..... and the corresponding cumulative frequencies.  
**upper class limits.**
3. (a) An observable characteristic of a population is called a **parameter**  
(b) A measure, such as the mean, based on sample data is called a **statistic**  
(c) The sum of the differences between each value and the mean is always equal to **zero**...  
(d) The midpoint of a set of values after they have been ordered from the minimum to the maximum values is called the **median**  
(e) What percentage of the values in every data set is larger than the median? **50%**.  
(f) The value of the observation that appears most frequently in a data set is called the **mode**.  
(g) The **range** is the difference between the maximum and minimum values in a data set.  
**variance**  
(h) The ..... is the arithmetic mean of the squared deviations from the mean.  
(i) The square of the standard deviation is the **variance**  
(j) Which of the following is least affected by an outlier? (mean, median, or range—pick one) **median**
4. For each statement, decide whether **descriptive** or **inferential** statistics is used.
- (a.) The average life expectancy in Cambodia is 70 years .  
(b.) A diet high in fruits and vegetables will lower blood pressure (Source: Institute of Medicine).  
(c.) The total amount of estimated losses for Hurricane Katrina was \$125 billion (Source: The World Almanac and Book of Facts).  
(d.) Researchers stated that the shape of a person's ears is relative to the person's aggression (Source: American Journal of Human Biology).  
(e.) In 2023, the number of high school graduates will be 3.2 million students (Source: National Center for Education).
5. Classify each variable as **qualitative** or **quantitative**.
- (a) Number of bicycles sold in 1 year by a large sporting goods store.  
(b) Colors of baseball caps in a store.  
(c) Times it takes to cut a lawn.  
(d) Capacity in cubic feet of six truck beds.  
(e) Classification of children in a day care center (infant, toddler, preschool).  
(f) Weights of fish caught in Lake George.  
(g) Marital status of faculty members in a large university.
6. Classify each variable as **discrete** or **continuous**.
- (a) Ages of people working in a large factory.  
(b) Number of cups of coffee served at a restaurant.  
(c) The amount of drug injections into a guinea pig.

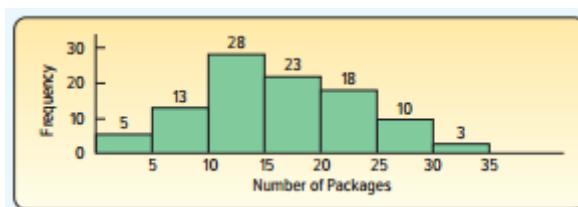
- (d) The time it takes a student to drive to school .
- (e) The number of gallons of milk sold each day at a grocery store.
7. The following data give the letter grades of 20 students enrolled in a statistics course.

A	B	F	A	C	C	D	A	B	F
C	D	B	A	B	A	F	B	C	A

- (a) Construct a bar graph.
- (b) Construct a pie chart.
8. A litter is a group of babies born from the same mother at the same time. Table 1.4.3 gives some examples of different mammals and their average litter size (source: <http://www.saburchill.com/chapters/chap0032.html>).

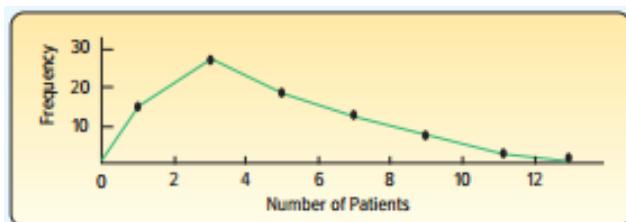
Species	Litter size
Bat	1
Dolphin	1
Chimpanzee	1
Lion	3
Hedgehog	5
Red Fox	6
Rabbit	6
Black Rat	11

- (a) Construct a bar graph.
- (b) Construct a pie chart.
9. Molly's Candle Shop has several retail stores in the coastal areas of North and South Carolina. Many of Molly's customers ask her to ship their purchases. The following chart shows the number of packages shipped per day for the last 100 days. For example, the first class shows that there were 5 days when the number of packages shipped was 0 up to 5.



- a. What is this chart called?
- b. What is the total number of packages shipped?
- c. What is the class interval?
- d. What is the number of packages shipped in the 10 up to 15 class?
- e. What is the relative frequency of packages shipped in the 10 up to 15 class?
- f. What is the midpoint of the 10 up to 15 class?

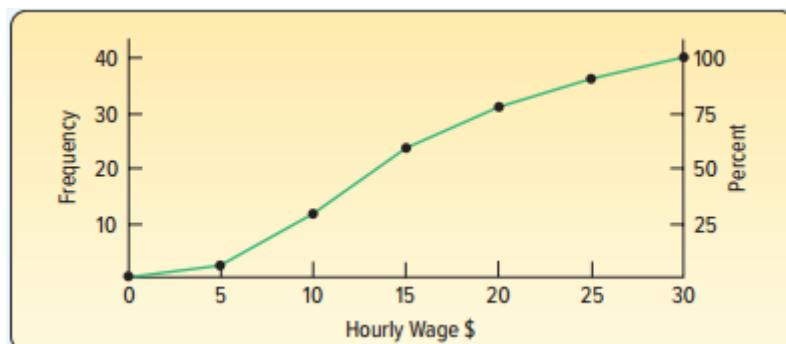
- g. On how many days were there 25 or more packages shipped?
10. The following chart shows the number of patients admitted daily to Memorial Hospital through the emergency room.



- a. What is the midpoint of the 2 up to 4 class?
- b. On how many days were 2 up to 4 patients admitted?
- c. What is the class interval?
- d. What is this chart called?
11. The following frequency distribution reports the number of frequent flier miles, reported in thousands, for employees of Brumley Statistical Consulting Inc. during the most recent quarter.

Frequent Flier Miles (000)	Number of Employees
0 up to 3	5
3 up to 6	12
6 up to 9	23
9 up to 12	8
12 up to 15	2
Total	50

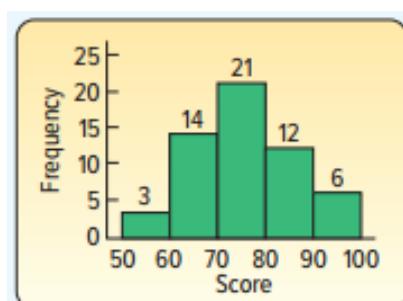
- a. How many employees were studied?  $5+12+23+8+2=50$
- b. What is the midpoint of the first class?
- c. Construct a histogram.
- d. A frequency polygon is to be drawn. What are the coordinates of the plot for the first class?
- e. Construct a frequency polygon.
- f. Interpret the frequent flier miles accumulated using the two charts.
12. The following cumulative frequency and the cumulative relative frequency polygon for the distribution of hourly wages of a sample of certified welders in the Atlanta, Georgia, area is shown in the graph.



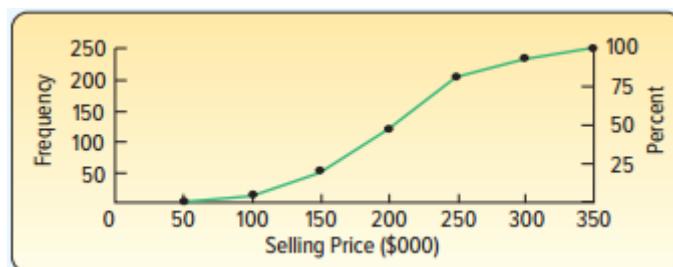
- a. How many welders were studied?
  - b. What is the class interval?
  - c. About how many welders earn less than \$10.00 per hour?
  - d. About 75% of the welders make less than what amount?
  - e. Ten of the welders studied made less than what amount?
  - f. What percent of the welders make less than \$20.00 per hour?
13. The frequency distribution representing the number of frequent flier miles accumulated by employees at Brumley Statistical Consulting Inc.

Frequent Flier Miles (000)	Number of Employees
0 up to 3	5
3 up to 6	12
6 up to 9	23
9 up to 12	8
12 up to 15	2
Total	50

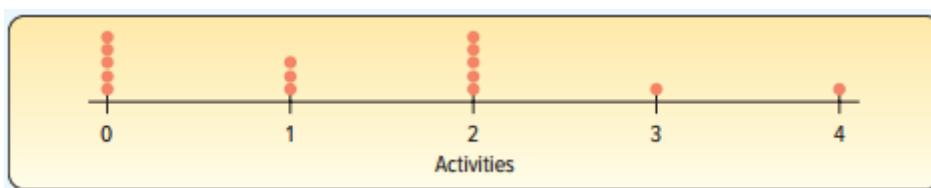
- a. How many employees accumulated less than 3,000 miles?
  - b. Convert the frequency distribution to a cumulative frequency distribution.
  - c. Portray the cumulative distribution in the form of a cumulative frequency polygon.
  - d. Based on the cumulative relative frequencies, about 75% of the employees accumulated how many miles or less?
14. The following is the number of minutes to commute from home to work for a group of 25 automobile executives.
- |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 28 | 25 | 48 | 37 | 41 | 19 | 32 | 26 | 16 | 23 | 23 | 29 | 36 |
| 31 | 26 | 21 | 32 | 25 | 31 | 43 | 35 | 42 | 38 | 33 | 28 |    |
- (a). find the number of class:**  
**Class desired k such that  $2^k > n$**   
**since  $n = 25 \Rightarrow 2^5 = 32 > 25$ .**
- a. How many classes would you recommend?
  - b. What class interval would you suggest?
  - c. What would you recommend as the lower limit of the first class?
  - d. Organize the data into a frequency distribution.
  - e. Comment on the shape of the frequency distribution.
15. The following histogram shows the scores on the first exam for a statistics class.



- a. How many students took the exam?
- b. What is the class interval?
- c. What is the class midpoint for the first class?
- d. How many students earned a score of less than 70?
16. The following chart summarizes the selling price of homes sold last month in the Sarasota, Florida, area.



- a. What is the chart called?
- b. How many homes were sold during the last month?
- c. What is the class interval?
- d. About 75% of the houses sold for less than what amount?
- e. One hundred seventy-five of the homes sold for less than what amount?
17. Refer to the following chart:
- Contact for Job Placement at Wake Forest University
- 
- | Contact Method             | Percentage |
|----------------------------|------------|
| Networking and Connections | 70%        |
| Job Posting Websites       | 20%        |
| On-Campus Recruiting       | 10%        |
- a. What is the name given to this type of chart?
- b. Suppose that 1,000 graduates will start a new job shortly after graduation. Estimate the number of graduates whose first contact for employment occurred through networking and other connections.
- c. Would it be reasonable to conclude that about 90% of job placements were made through networking, connections, and job posting websites? Cite evidence
18. A sample of students attending Southeast Florida University is asked the number of social activities in which they participated last week. The chart below was prepared from the sample data.



- a. What is the name given to this chart?
- b. How many students were in the study?
- c. How many students reported attending no social activities?
19. Eleven insurance companies reported their market capitalization (in millions of dollars) for the most recent fiscal year as:
- $$15 \quad 17 \quad 23 \quad 26 \quad 27 \quad 35 \quad 72 \quad 88 \quad 91 \quad 98 \quad 102$$
- a. Draw a dot plot of the data.
- b. Determine the median market capitalization.
- c. Compute the first quartile of market capitalization.
- d. Find the 75th percentile of market capitalization.
- e. Make a box plot of the data.
20. In recent years, due to low interest rates, many homeowners refinanced their home mortgages. Linda Lahey is a mortgage officer at Down River Federal Savings and Loan. Below is the amount refinanced for 20 loans she processed last week. The data are reported in thousands of dollars and arranged from smallest to largest.
- $$59.2 \quad 59.5 \quad 61.6 \quad 65.5 \quad 66.6 \quad 72.9 \quad 74.8 \quad 77.3 \quad 79.2 \quad 83.7 \\ 85.6 \quad 85.8 \quad 86.6 \quad 87.0 \quad 87.1 \quad 90.2 \quad 93.3 \quad 98.6 \quad 100.2 \quad 100.7$$
- a. Find the median, first quartile, and third quartile.
- b. Find the 26th and 83rd percentiles.
- c. Draw a box plot of the data.
21. The heights (in cm) of a sample of the students in a class are shown:
- $$50 \quad 52 \quad 70 \quad 72 \quad 65 \quad 52 \quad 60 \\ 75 \quad 51 \quad 64 \quad 65 \quad 55 \quad 67 \quad 70$$

Find the mean, mode, median, inter quartile range, midrange, variance, and standard deviation for the data.

22. A Texas farm co-op sponsored a health screening for its members. Part of the process included a blood pressure screen. The results of the blood pressure screen are summarized by age groups in the following table:

Blood Pressure	Age			Total
	Under 30	30 up to 60	Over 60	
Low	21	29	37	87
Medium	45	82	91	218
High	23	46	75	144
Total	89	157	203	449

- a. What fraction of the members have high blood pressure?
- b. What fraction of the “Under 30” members have low blood pressure?
- c. Is there a relationship between age and blood pressure? Describe it.
23. For the following data:
- |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 6.3 | 2.9 | 4.5 | 1.1 | 1.8 | 4.0 | 1.2 | 3.1 | 2.0 | 4.0 |
| 7.0 | 2.8 | 4.3 | 5.3 | 2.9 | 8.3 | 4.4 | 2.8 | 3.1 | 5.6 |
| 4.5 | 4.5 | 5.7 | 0.5 | 6.2 | 3.7 | 0.9 | 2.4 | 3.0 | 3.5 |
- (a) Find the mean, variance, standard deviation, mode, median,  $Q_1$ ,  $Q_3$ , and 90th percentile.
- (b) Construct a frequency table with five classes.
- (c) Using the grouped data formula, find the mean, variance, standard deviation, mode, median,  $Q_1$ ,  $Q_3$ , and 90th percentile for the frequency table constructed in part (b) and compare it to the results in part (a).
- (d) Construct a histogram, and comment on the shape of the data.
24. For the following data:
- |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 6.3 | 2.9 | 4.5 | 1.1 | 1.8 | 4.0 | 1.2 | 3.1 | 2.0 | 4.0 |
| 7.0 | 2.8 | 4.3 | 5.3 | 2.9 | 8.3 | 4.4 | 2.8 | 3.1 | 5.6 |
| 4.5 | 4.5 | 5.7 | 0.5 | 6.2 | 3.7 | 0.9 | 2.4 | 3.0 | 3.5 |
- (a) Find the mean, variance, standard deviation, mode, median,  $Q_1$ ,  $Q_3$ , and 90th percentile.
- (b) Construct a frequency table with five classes.
- (c) Using the grouped data formula, find the mean, variance, standard deviation, mode, median,  $Q_1$ ,  $Q_3$ , and 90th percentile for the frequency table constructed in part (b) and compare it to the results in part (a).
- (d) Construct a histogram, and comment on the shape of the data.
25. The following sample data are the midterm examination test scores for 30 students:

55	60	91	85	60	70	89	99	59	67
72	82	60	68	57	74	64	70	68	91
89	90	83	40	79	85	71	80	76	81

- a. Find the mean, variance, standard deviation, mode, median, , and of the data.
- b. Construct a frequency table with five classes.
- c. Using the grouped data formula, find the mean, variance, standard deviation, mode, median, , and for the table in part (b) and compare it to the results in part (a).
- d. Construct a histogram.