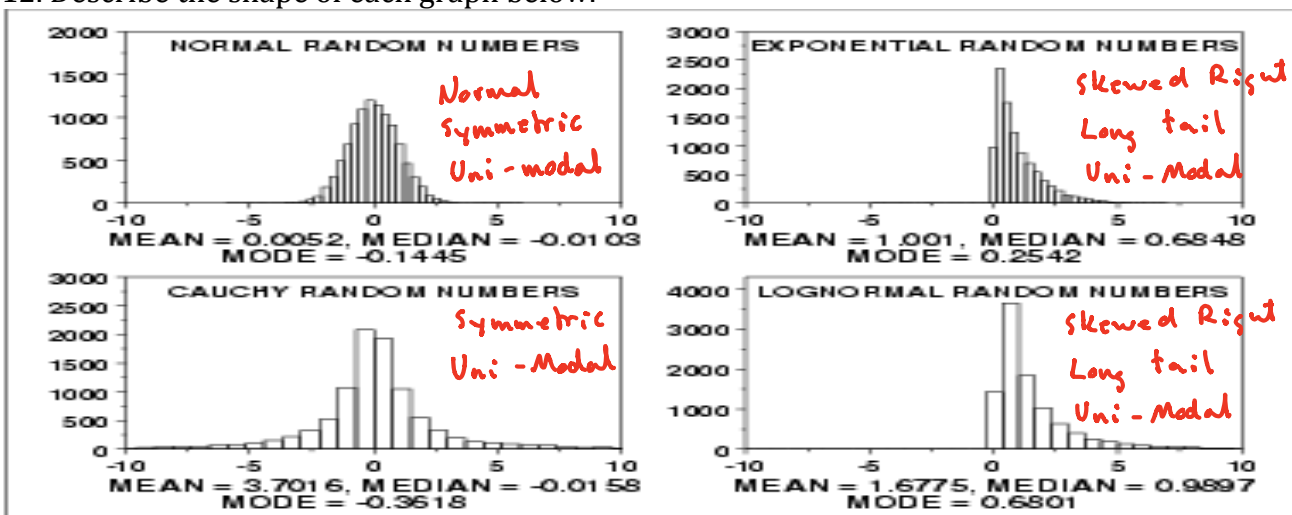**Sampling:** Determine which type of sampling method was used in each survey.

1. To get a sense of election outcomes, a political group chooses ten precincts to conduct a survey of voters in those areas.   Cluster

2. A company is taking a survey of its employees and separates them into the following groups: Male/Part-Time, Male/Full-Time, Female/Part-Time, Female/Full-Time.   Cluster

3. A researcher wants to randomly select certain classes, then interview every student in only those classes.   Cluster

4. A group of students in a high school do a study about teacher attitudes. They interview teachers at the school.   Convenience

5. A researcher wants to select ten students for a survey. Each student's name is placed in a hat and 10 names are selected.   Random

6. A researcher wants to sample eight houses from a street of 120 houses. Every 15th house is beginning with house #11. The houses selected are 11, 26, 41, 56, 71, 86, 101, and 116.   Systematic

7. The researcher stands at a shopping mall and selects the first 75 shoppers as they walk by to fill out a survey.   Convenience

8. To determine the average milk yield of each cow type in his herd, a farmer divides his herd into four sup-groups and takes samples from each group.   Stratified

9. All senior's names are placed into a fishbowl and 5 names are drawn to complete a college survey.   Random

10. A researcher selects 15 households from each zip code in the Houston area.   Stratified

12. Describe the shape of each graph below.

NORMAL RANDOM NUMBERS
MEAN = 0.0052, MEDIAN = -0.0103
MODE = -0.1445
Normal
Symmetric
Uni-modal

EXPONENTIAL RANDOM NUMBERS
MEAN = 1.001, MEDIAN = 0.6848
MODE = 0.2542
Skewed Right
Long tail
Uni-Modal

CAUCHY RANDOM NUMBERS
MEAN = 3.7016, MEDIAN = -0.0158
MODE = -0.3618
Symmetric
Uni-Modal

LOGNORMAL RANDOM NUMBERS
MEAN = 1.6775, MEDIAN = 0.9897
MODE = 0.6801
Skewed Right
Long tail
Uni-Modal

13. The heights (in inches) of 30 adult males are listed below.
      70 72 71 70 69 73 69 68 70 71
      67 71 70 74 69 68 71 71 71 72
      69 71 68 67 73 74 70 71 69 68

Construct a frequency table, stem-and-leaf, histogram, and compute the 5 number summary, and finds the standard deviation and variance. Then describe the distribution of the data.

|	
67 - 69	6
69 - 71	10
71 - 73	10
73 - 75	4

Min: 67
Q1: 69
Med: 70
Q3: 71
Max: 74

$\sigma = 1.856$
$v = 3.4456$
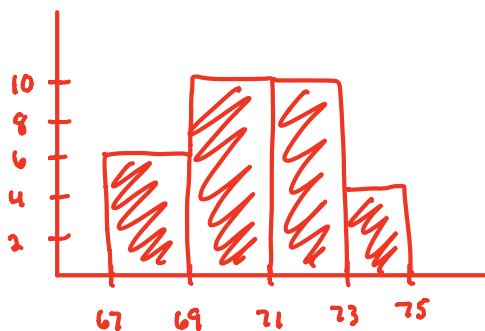
Bi - modal
Symmetric

6 | 7,7, 8,8, 8,8, 9,9, 9,9,9
7 | 0,0,0,0,0, 1,1,1, 1,1,1,1,1, 2,2, 3,3, 4,4   Key: 6|7 = 67

14. SAT verbal scores are normally distributed with a mean of 489 and a standard deviation of 93. Use the Empirical Rule (also called 68-95-99.7 Rule) to determine what percentage of the scores lie:
a) between 303 and 582. 34 + 34 + 13.5 = 81.5%

b) above 675? 2.35 + .15 = 2.5%

.15 | 2.35 | 13.5 | 34 | 34 | 13.5 | 2.35 | .15
210   303   396   489   582   675   768
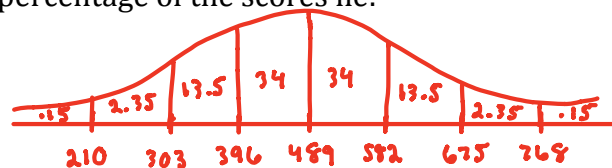
c) If 3,500 students took the SAT verbal test, about how many received between 396 and 675 points?
      81.5% → .815(3500) = 2852 students

15. The scores of the top ten finishers in a recent golf tournament:
      71 67 67 72 76 72 73 68 72 72.
Suppose the players increase their games by 5 points. How will the measures of central tendency be changed?

	Old	New
Mean :	71	76
Median:	67	72
Mode :	72	77

They will go up by 5.

16. Approximate the mean, median and mode of the grouped data:

Heights of Males		Frequency
63-65	64	3
66-68	67	6
69-71	70	7
72-74	73	4
75-77	76	3

Mean: 69.7
Median: 70
Mode: 70

17. A random sample of the age of employees in a City Hall:

Age		frequency
20-29	25	5
30-39	35	10
40-49	45	12
50-59	55	8
60-69	65	5

Mean: 44.5
Median: 45
Mode: 45

~~What percentage of the City Hall employees are between 31.8 and 68.4 years old?~~

~~If there are 120 employees in a City Hall, approximately how many of them are:~~
~~a) between 31.8 and 56.2 years old?~~

~~b) older than 68.4?~~

18. Which data set has a) highest mean and b) standard deviation

iii

i)
```
0 | 9
1 | 5 8
2 | 3 3 7 7
3 | 2 5
4 | 1
```
Key: 1|5 =15
Mean: 25
σ: 9.09

iii + i

ii)
```
0 |
1 | 5 8 9
2 | 3 3 7 3
3 | 2 5 6
4 |
```
Key: 1|5 =15
Mean: 25.1
σ: 6.86

iii)
```
10 | 9
11 | 5 8
12 | 3 3 7 7
13 | 2 5
14 | 1
```
Key: 10|1 = 101
Mean: 125
σ: 9.09

19. The Laboratory of Ornithology holds an annual Christmas Bird Count, in which birdwatchers at various locations around the country see how many different species of birds they can spot. Here are some of the counts reported from sites in Texas during the 1999 event.

| 228 | 178 | 186 | 162 | 206 | 166 | 163 | 183 | 181 | 206 | 177 |
| 175 | 167 | 162 | 160 | 160 | 157 | 156 | 153 | 153 | 152 | |

a. Create a stem and leaf display of these data.
```
15 | 2,3,3,6,7
16 | 0,0,2,2,3,6,7
17 | 5,7,8
18 | 1,3,6
20 | 6,6
22 | 8
```

b. Create a histogram of this data.

150 – 160	5
160 – 170	7
170 – 180	3
180 – 190	3
200 – 210	2
220 – 230	1
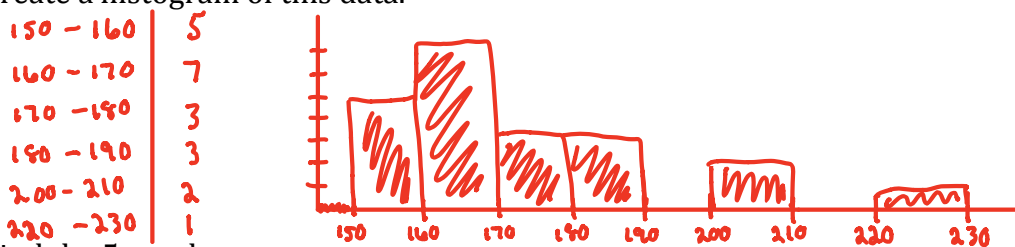
c. Find the 5 number summary.

Max: 152
Q1: 158.5
Med: 166
Q3: 182
Max: 228

3

d. State the IQR. What does this information tell you about the number of birds sighted?

$= 182 - 158.5$ Helps us find outliers

$= 23.5$

e. Write a brief description of the distribution of the data.

skewed right ; gaps

f. Considering the data collected, what count would be considered an outlier? Are there any outliers? If we took the outlier out, how would this affect our five number summary?

$182 + 23.5(1.5) = 217.25$ $158.5 - 23.5(1.5) = 123.25$

$\# > 217.25$ $\# < 123.25$

g. Calculate the mean, median and mode. Which central tendency best represents the data? Explain.

Mean: 172.9
Median: 166   Mean ; no outliers
Mode: 153 & 162

h. If each person said they counted one less than they had previously stated, how would this affect the mean, five number summary, and standard deviation (if at all)?

Decrease all by 1

i. Calculate the standard deviation. 225 is within how many standard deviations from the mean? 163 is within how many standard deviations from the mean?

$\sigma = 19.7$ $z = \dfrac{225 - 172.9}{19.7}$ $z = \dfrac{163 - 172.9}{19.7}$
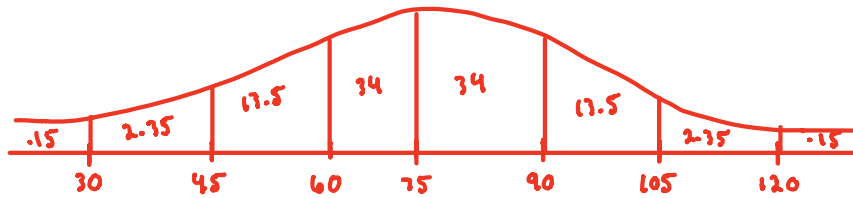
$z = 2.6$ $z = -.5$

j. 68% of the data falls between __1 σ__, 95% of the data falls between __2 σ__, and 99% of the data falls between __3 σ__.

k. The percentage that spotted over 232 birds is? .15%

20. A grading scale is set up for 1000 students' test scores. It is assumed that the scores are normally distributed with a mean score of 75 and a standard deviation of 15.

a. Construct a normal distribution curve.

b. How many students will have scores between 45 and 75?

$47.5\% \rightarrow .475(1000) = 475$ students

c. If 60 is the lowest passing score, how many students are expected to pass the test?

$84\% \rightarrow .84(1000) = 840$ students

21. Given the frequency table, find the following:

Score	#Students
60-70	2
70-80	8
80-90	11
90-100	6

65
75
85
95

a. The mean, median, mode, and total number of students in the class.

↓   ↓   ↓
$82.\overline{7}$ 85   85

b. If the teacher decided to give everyone a 5 point curve, how would that affect the mean and standard deviation (if at all)?

Increase mean by 5

c. If a student made up a test and made a 62, how would that affect the five number summary?

No effect at all

22. Explanation problems.

a. When comparing data, how would you know which collection had more variation among its data?

larger standard deviation

b. Look back over ALL the homework problems and your quizzes!

STUDY!

23. Susan's test scores in biology are shown below.

  73, 84, 91, 68, 83

A. Which of the following measures would be the best for her report card?
  a. mean
  b. median
  c. range
  d. mode

B. Which of the following statements is true?
  a. The mean is greater than the median.
  b. The range is greater than 50.
  c. The median is between 80 and 90.
  d. The mode is 23

24. The average monthly precipitation (in inches) in Richmond,Virginia, for the months of January through April is listed below.

  3.24   3.16   3.61   2.96

A. If the precipitation in May is 3.84 inches, which of the following measures will remain unchanged?
  a. mean
  b. median
  c. mode
  d. range

B. With May's precipitation added to the data set, which of the following statistical measures will change the most?
  a. mean
  b. median
  c. mode
  d. range

25. Justine calculated the median price for six new cars. The prices she used are listed below.

  $19,580 $24,987 $26,594 $10,876 $12,235 $19,699

If she suddenly realizes that the price of the fourth car was supposed to be $11,876, what would the effect on the median be if she recalculated it?

A. The median price decreases by $1,000.
B. The median price increases by $166.66.
C. The median price increases by $1,000.
D. The median price increases by $0.