β

Illowsky – Chapt. 1 & 2
Larson – Chapt. 1 & 2

Name __Key__
Date __/__/__

1. Explain why it is usually more practical to use a sample instead of a population. (+2)

Impractical / Expensive / Impossible to use/find population

2. Which level of measurement is the data represented by a bank account balance. (+2)

Ratio

3. Explain stratified sampling. (+2)

Pop divided into groups and SRS is taken from each group.

4. A report sponsored by the **California Body-Building Products** stated that muscle growth *can* be increased by drinking at least one glass of their product each day. Determine if the report is biased. (+2)

Yes, CBB has a stake in their own product

5. The scores for a statistics class are as presented:

$CW = 50 - 33 = \dfrac{17}{6} \Rightarrow 3$

44 38 41 50 36 36 43 42 49 48
35 40 37 41 43 50 46 45 39 38
50 41 47 36 35 40 42 43 48 33

a. Complete the frequency distribution below given the data for this problem using <u>six</u> classes. (+12)

Classes	Class Boundaries	Frequency	Midpoints	Relative Frequency	Cumulative Frequency
33 - 35	32.5 - 35.5	3	34	.1	3
36 - 38	35.5 - 38.5	6	37	.2	9
39 - 41	38.5 - 41.5	6	40	.2	15
42 - 44	41.5 - 44.5	6	43	.2	21
45 - 47	44.5 - 47.5	3	46	.1	24
48 - 50	47.5 - 50.5	6	49	.2	30

b. Construct a frequency histogram using the six classes. Be sure to label all axes and show units. **Label with class midpoints. (+10)**

Hrstogram w/ Midpoint

Freq

6

3

34 37 40 43 46 49 (x)
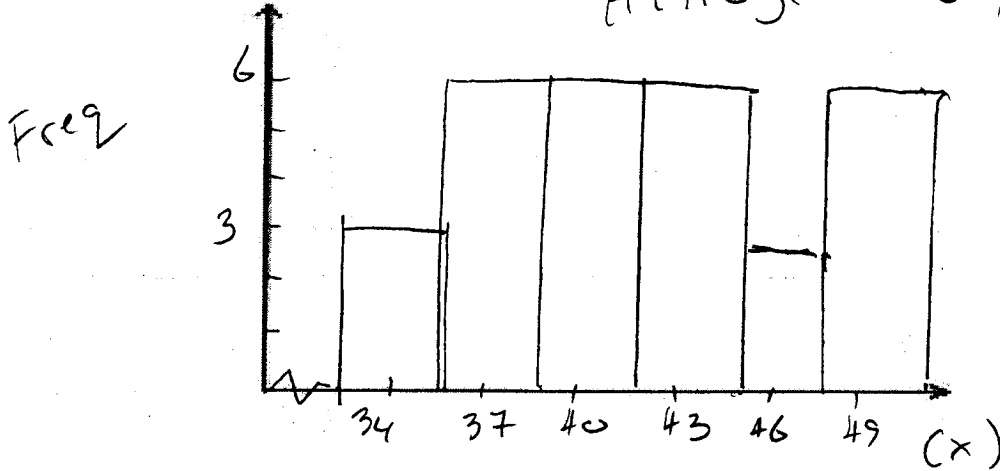
c. Construct an ogive using the six classes (Cumulative frequency graph). Be sure to label all axes and show units. (+10)

Ogive

cum
Freq

30

20

10

32.6 35.5 38.5 41.5 44.5 47.5 50.5 (x)
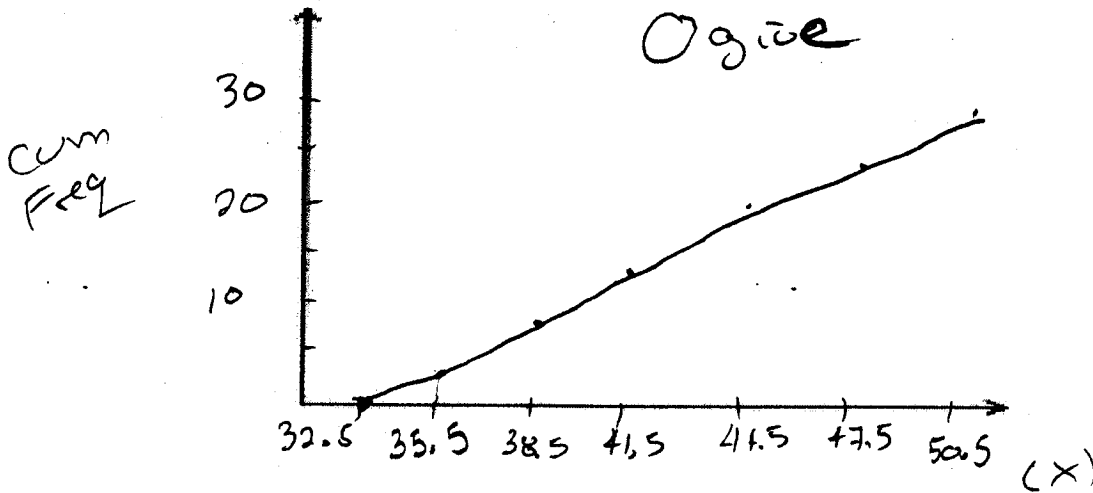
6. The numbers of pull-ups completed in a minute by 18 athletes in a pull-up competition are as presented. Create a stem-and-leaf plot for this data. What can you conclude about the data? (+10)

16 25 24 19 33 25 34 46 22
33 42 40 32 34 49 75 46 45

Key 4|9 = 49

```
1 | 6 9
2 | 4 5 5
3 | 2 3 3 4 7
4 | 0 2 5 6 6 9
5 |
6 |
7 | 3
```

most of the
athletes did
32 - 49 pullups

7. Determine whether the approximate shape of the distribution in the histogram regarding California earthquakes is symmetric, uniform, skewed left, skewed right, or none of these. (+2)

Skewed
Right

8. Find the mean, median, and mode of the following numbers **by hand.** You may show your work below in the box provided: (+6)

65 68 61 65 58 66 65 59 60 63

Work space:
$\Sigma x = 630$
$\bar{x} = \dfrac{630}{10}$

Mean: $= 63$ Median: 64 Mode: 65

9. Explain the difference between using μ and $\bar{x}$ when representing a mean. (+2)

μ : Population mean

$\bar{x}$: Sample mean

10. Find the population variance and the population standard deviation __by hand__ given the following data set: 8, 6, 7, 5, 3, 0, 9. Show all work in the work space provided. (+12)

Work space:	$\bar{x} = 5.4$	
X	$X - \bar{x}$	$(X - \bar{x})^2$
8	2.6	6.76
6	.6	.36
7	1.6	2.56
5	-.4	.16
3	-2.4	5.76
0	-5.4	29.16
9	3.6	12.96

$\Sigma = 57.92$

Variance =

$$V = \frac{57.92}{7} = 8.27$$

Standard Deviation =

$$SD = \sqrt{8.27} = 2.88$$

11. The mean IQ score of adults is 100, with a standard deviation of 15. Use the Empirical Rule to find the percentage of adults with scores between 70 and 130. (Assume the data set has a bell-shaped distribution.) (+7)

70   100   130

95%

$$CV = \frac{s}{u}$$
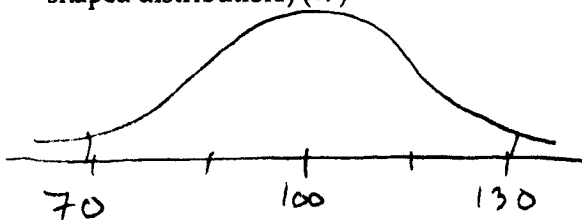
12. The customer service department of a phone company is experimenting with two different systems. On Monday they try the first system which is based on an automated menu system. On Tuesday they try the second system in which each caller is immediately connected with a live agent. A quality control manager selects a sample of seven calls each day. He records the time for each customer to have his or her question answered. The times (in minutes) are listed below. (+5)

Automated Menu: 11.2 7.2 4.0 2.9 9.2 6.3 5.5 $CV = \frac{2.67}{6.61} = 40.4$

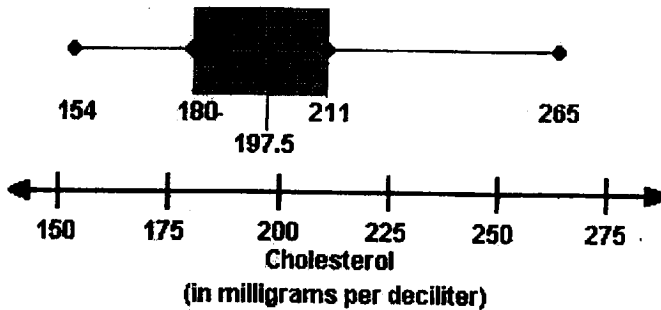Live agent: 6.3 2.5 4.8 4.1 3.4 5.2 3.7 $\frac{1.17}{4.29} = 27.3$

Find the coefficient of variation for each of the two sets of data, then compare the variation. Which times have more variation? Round results to one decimal place.

$CV_{Am} = 40.4$

$CV_{LA} = 27.3$ $\Rightarrow CV_{am} \text{ greater}$

13. Use the provided box-and-whisker plot to determine the correct answer. (+2)

154   180   211   265
197.5

150   175   200   225   250   275
Cholesterol
(in milligrams per deciliter)

a) One half of the cholesterol levels are between 180 and 197.5.
b) About 75% of the adults have cholesterol levels less than 180.
c) One half of the cholesterol levels are between 180 and 211.
d) About 25% of the adults have cholesterol levels of at most 211.

14. The test scores of 30 students are listed below. Find the Five-Number Summary and then draw a box-and-whisker plot below that represents the data. Label the horizontal axis. (+6)

31 41 45 48 52 55 56 56 63 65
67 67 69 70 70 74 75 78 79 79
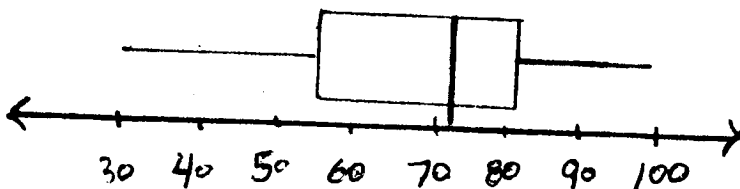80 81 83 85 85 87 90 92 95 99

$L = 31$

$Q_1 = 56$

$(med) Q_2 = 72$

$Q_3 = 83$

$m = 99$

30 40 50 60 70 80 90 100

15. Many firms use on-the-job training to teach their employees computer programming. Suppose you work in the personnel department of a firm that just finished training a group of its employees to program, and you have been requested to review the performance of one of the trainees on the final test that was given to all trainees. The mean and standard deviation of the test scores are 81 and 3, respectively, and the distribution of scores is bell-shaped and symmetric. Suppose the trainee in question received a score of 77. Compute the trainee's z-score. (+4)

$$z = \frac{77 - 81}{3} = \frac{-4}{3} = \boxed{-1.3}$$

16. The graph below is an ogive of scores on a recent statistics exam. Use the graph to approximate the test score that corresponds to the 52nd percentile. (+2)

56

Percentile Curve

Overall Score
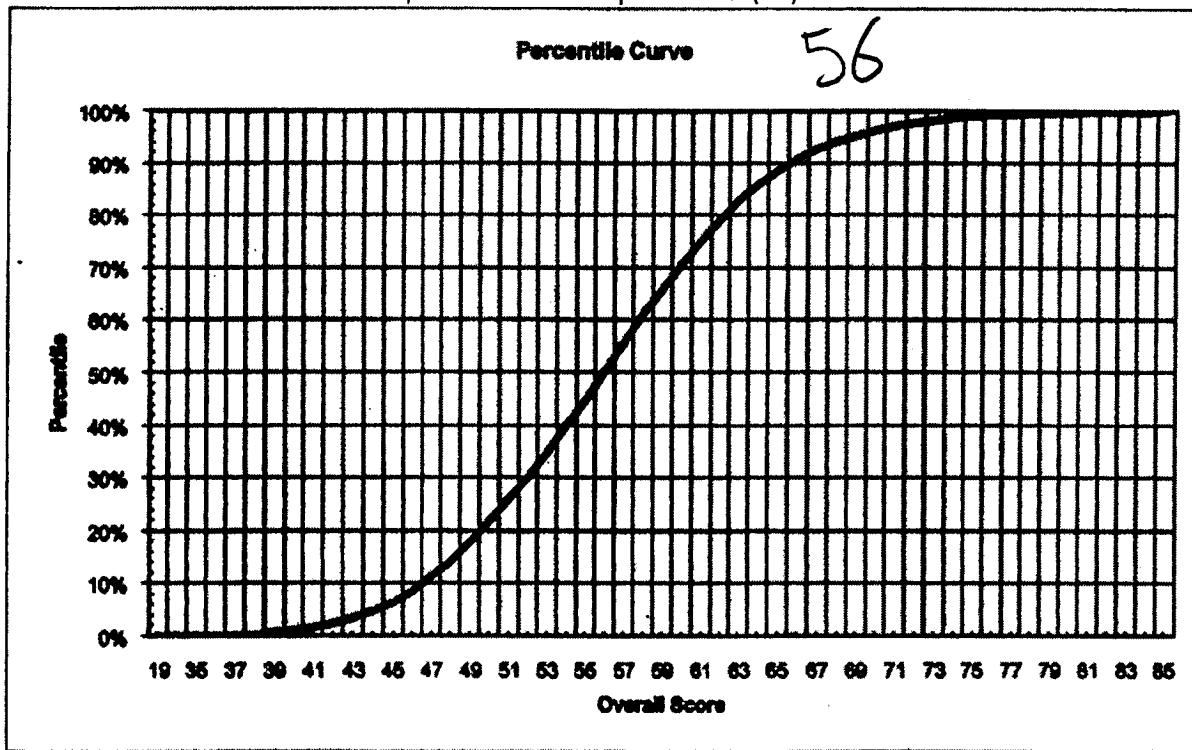
17. A student's SAT score is in the 90th percentile. What can you conclude about the student's test score? (+2)

Higher Than 90% of The Students who took The Test.