Chapter 1:

1) Which of the following is a random sample?

A) Bill uses a computer to randomly generate numbers to choose which senators to whom he will send a letter (RANDOM)

B) Every fifth patron at a movie theater is searched for weapons (SYSTEMATIC)

C) Every student at a high school is surveyed (POPULATION OR CLUSTER)

D) Five statistics classes at Generic College are selected and each person in those classes is surveyed (CLUSTER)

2) Which sampling technique is used if a researcher randomly selects and interviews 40 male and 40 female teachers at a given university?

A) Random B) Stratified C) Cluster D) Convenience

3) Which method of data collection would you use to collect data for a study about the effects of a certain drug given to 10 patients and a placebo given to another group of 10 patients to determine if the drug is effective?

A) Perform an experiment B) Use a simulation

C) Take a census D) Use sampling

4) Which method of data collection would you use to collect data for a study of the salaries of college professors in the United States?

A) Perform an experiment B) Use a simulation

C) Take a census D) Use sampling

5) A recent survey conducted by NGHS students indicated that the average number of CDs owned by 1,000 of its students was 34. Does this value describe a population parameter or a sample statistic?

A) population parameter B) sample statistic

6) The average salary of all Ford workers is $37,000. Does this value describe a population parameter or a sample statistic?

A) population parameter B) sample statistic

7) In a study of the opinions of 18-25 year old adults in the United States, which of the following would NOT be a biased sample?

A) sophomores at the University of Georgia

B) 18-25 year olds with children

C) an internet poll of 18-25 year old adults

D) a random number generated telephone survey of all 18-25 year old adults

8) There are 900 students in a school. You wish to collect a random sample asking how many pets each student owns. You only have time to ask 25 students about their pets. If you were to use the 2nd row of the following random number table, which four students will be the first four you would you ask about their pets?

Table – Random Numbers			
92630	78240	19267	95457
79445	78735	71549	44843
59654	71966	27386	50004
31524	49587	76612	39789
06348	76938	90379	51392
etc……			

A) 79, 44, 57, 78
B) 794, 457, 873, 571
C) 7, 9, 4, 4
D) 9, 7, 5, 3

9) What is the first step in building a model for simulating a given problem?
A) identify and correct, if possible, any errors in the experiment
B) use descriptive statistics to describe the data
C) identify the variable(s) of interest and the population of the study
D) collect the data

Chapter 2

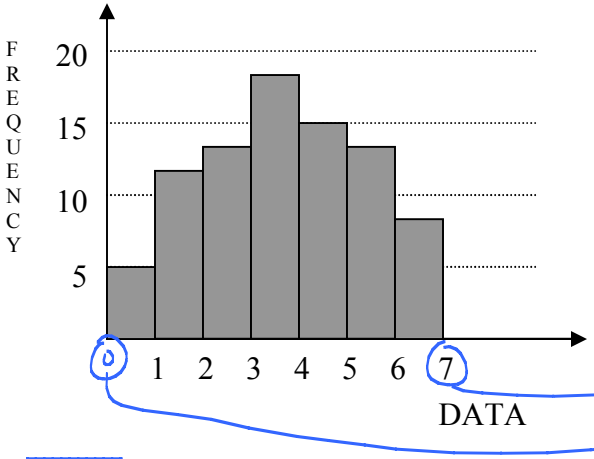
10) For the following data, approximate the mean miles per day.

Miles (per day)	Frequency
1-2	9
3-4	22
5-6	28
7-8	15
9-10	4

```
9+22+28+15+4
                78
(1.5*9+3.5*22+5.
5*28+7.5*15+9.5*
4)/78
     5.064102564
```

A) 2 B) 4 C) 5 D) 10

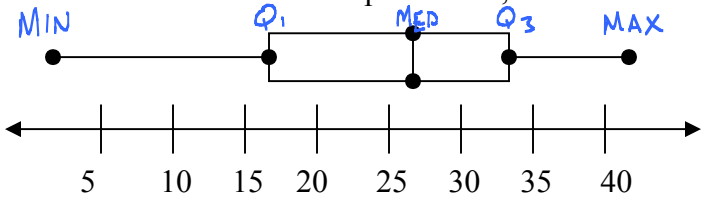
11) Find the range of the data represented by the graph.



RANGE = HI - LO
7 - 0 = 7

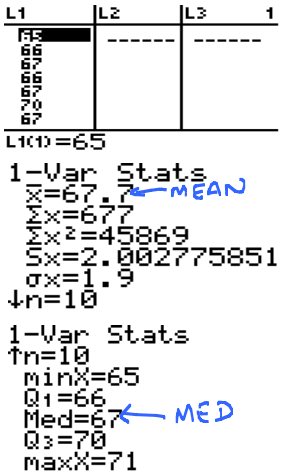
A) 17 B) 7 C) 20 d) 5

12) From the box-and-whisker plot below, find the median of the data.



A) 16 **B) 27** C) 33 D) 41

For questions 13-15: The scores of the top ten finishers in a recent race are as follows:
65 66 67 66 67 70 67 70 71 68



13) Find the mean score.

A) 65.5 **B) 67.7** C) 71.1 D) 70.0

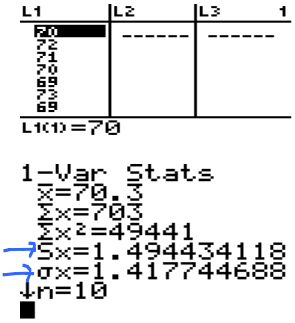
14) Find the median score.

A) 65 **B) 67** C) 67.5 D) 68

15) Find the mode of the scores. (OCCURS THE MOST)

A) 70 B) 66 **C) 67** D) no mode

Questions 16 & 17: The heights in inches of 10 adult males are listed below.
70 72 71 70 69 73 69 68 70 71



16) Find the sample standard deviation.

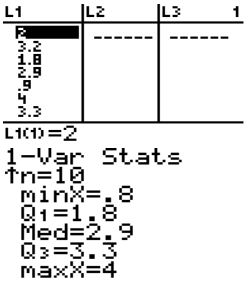
A) 70 B) 3 **C) 1.49** D) 2.38

17) Find the population variance.

A) 2.01 B) 2.48 C) 1.42 D) 10

(POP. STD DEV)² = POP. VAR (1.418)² = 2.01

18) The grade point averages for 10 students are listed below. Find the interquartile range for the scores. 2.0 3.2 1.8 2.9 0.9 4.0 3.3 2.9 3.6 0.8

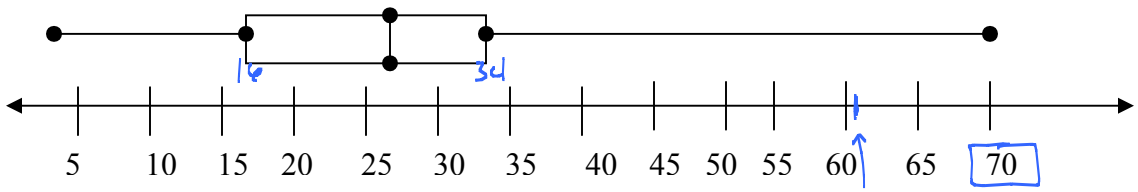


A) 3.3 B) 1.8 C) 2.9 **D) 1.5**

$Q_3 - Q_1 = IQR$
$3.3 - 1.8 = 1.5$

19) What are the outliers, if any, for the following box-and whisker plot?

34 - 16 = 18 1.5(18) = 27



ANYTHING BEYOND HERE ARE OUTLIERS

A) 4 **B) 70** C) 4 and 70 D) there are none

Questions 20-22: Consider the following data for the sale prices of 7 houses in a new neighborhood over the last month: $100,000 $150,000 $170,000 $190,000 $190,000 $475,000 $195,000

DATA	$\bar{x}$	$\lvert x-\bar{x}\rvert$
100000	210000	110000
150000		60000
170000		40000
190000		20000
190000		20000
475000		265000
195000		15000
		530000

20) What is the absolute mean deviation of the 7 homes ?

A) $210,000 B) $75,714.29 C) $147,000 D) $112,472.22

$\frac{530000}{7} = 75714.29$

21) Which, if any, of the prices of the homes is an outlier?

A) $100,000 B) $190,000 C) $475,000 D) none

22) What would happen to the sample statistics if an 8th home was sold during that month for $220,000 (adding the additional data point to the original 7 data point).

A. $\bar{x}$ increases, σ increase
B. $\bar{x}$ decreases, σ decreases
C. $\bar{x}$ decreases, σ increases
D. $\bar{x}$ increases, σ decreases

ORIGINAL 7	WITH EXTRA HOUSE
$\bar{x} = 210000$	$\bar{x} = 211250$ ↑
$\sigma = 112472$	$\sigma = 105260$ ↓

Chapter 3

23) In the following simulation of a coin toss done on a random number generator, by ***what percentage is the probability different*** from the theoretical probability of obtaining "Heads". (Note: 1 = Heads; 2 = Tails) {1 2 1 1 1 2 2 1 2 1 2 2 1 1}

A) 0% B) 50% C) 3% D) 7%

EMPERICAL = $\frac{8}{14} \approx .5714$ THEORETICA = 0.5

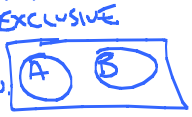
.57 − .5 = .07

24) What is the probability of the intersection of events A and B if the two events are mutually exclusive?

A) 0 B) 1 C) ½ D) unable to determine from the given information

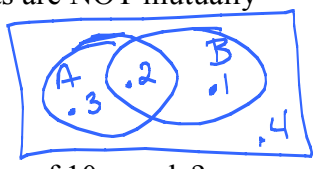
← MUTUALLY EXCLUSIVE EVENTS DON'T HAVE AN INTERSECTION.

MUTUAL EXCLUSIVE



25) What is the probability of the union of A and B, if the two events are NOT mutually exclusive, P(A) = .5 , P(B) = .3, and P(A or B) = .6 ?

INTERSECTION



A) .5 B) .2 C) .6 D) 0

26) In how many ways can a committee of 3 be selected from a group of 10 people?

A) 720 B) 3,628,800 C) 120 D) 6

$_{10}C_3 = \frac{10!}{7!3!}$

10 nCr 3
120

27) If I have 3 interior colors, 4 exterior colors, and 2 sizes, how many different cars can be made?

$3 \cdot 4 \cdot 2 = 24$

A) 24 B) 9 C) 4 D) 2

28) If P(A) = .4, what is $P(A^c)$?

A) .4 B) 0 C) .2 D) .6

29) Use the data in the following table to determine the probability of randomly selecting a man given that the person is a smoker.

	Nonsmoker	Smoker	Total
Men	45	11	56
Women	56	9	65
Total	101	20	121

A) 45/56 B) 11/56 C) 45/121 D) 11/20

30) The odds of an event are 2:7. This means that:

A) you have 2 failures out of every 7 trials
B) you have 2 successes out of every 9 trials
C) you have 2 successes out of every 7 trials
D) you have 2 failures out of every 9 trials

31) What are the odds of rolling a 2 or a 3 on a single die? 2:4 or 1:2

A) 1: 2 B) 1: 3 C) 1: 6 D) 2: 1

32) What is the probability of drawing an ace from a standard deck of cards?

A) ¼ B) 0 C)1/52 D) 1/13 $\frac{4}{52} = \frac{1}{13}$

33) Which of the following best describes the "Law of Large Numbers"?

A) As an experiment is repeated again and again, the empirical probability of an event approaches the theoretical probability of the event.
B) As an experiment is repeated again and again, the empirical probability of an event approaches the subjective probability of the event.
C) As an experiment is repeated again and again, the empirical probability of an event approaches 1.
D) As an experiment is repeated again and again, the empirical probability of an event approaches 0.

34) What is the probability of choosing a black marble from a bag of 4 black and 6 blue marbles?

A) 2/3 B) 3/5 C) 2/5 D) 0 $\frac{4}{10} = \frac{2}{5}$

Chapter 4

Questions 35-36: Determine if the variable is discrete or continuous.

35) The weight of a player on a wrestling team.

A) discrete B) continuous

36) The number of goals scored in a hockey game.

A) discrete B) continuous

37) According to government data, the probability that an adult was never married is 15%. In a random survey of 10 adults, what is the probability that two or fewer were never married?

A) 0.002 B) 0.800 C) 0.820 D) 0.200

BINOMCDF (10, .15, 2)

binomcdf(10, .15, 2)
.8201964804

38) A statistics teacher finds that when she schedules tutoring at the 2:30 time slot, an average of 3 students arrives. Use the Poisson distribution to find the probability that in a randomly selected tutoring session, four students will arrive.

A) 0.1680 B) 0.1954 C) 0.2240 D) 0.2707

POISSONPDF(μ, x)
POISSONPDF (3, 4)

poissonpdf(3,4)
.1680313557

39) A company ships computer components. Assume that 1 in every 50 is defective. Use the geometric distribution to find the probability that the first defective component sold is the 7th component sold.

A) 0.143 B) 0.0177 C) 0.0469 D) 0.98

GEOMPDF (1/50, 7)

geometpdf(1/50,7)
.0177168476

40) 15% of all adults say that chocolate chip is their favorite cookie. You randomly select 20 adults and ask them to name his or her favorite cookie. What is the mean and standard deviation of the corresponding binomial distribution?

$\mu = np = (20)(.15) = 3$

$\sigma = \sqrt{npq} = \sqrt{20(.15)(.85)} \approx$

A. 3, 1.597 B. 3, 2.55 C. .85, 2.55 D. .85, 1.597

√(20*.15*.85)
1.596871942

Questions 41-42: The following probability distribution represents the probability that a certain shopper will purchase 0, 1, 2, 3, or 4 items.

x	0	1	2	3	4
P(x)	0.15	0.18	0.24	?	0.36

41) What is the missing value in the probability distribution?

.15+.18+.24+.36
.93
1-.93
.07

A) .16 B) .93 C) .07 D) cannot be determined from the given information

42) Calculate the expected value of the random variable.

A) 2.96 B) 2.31 C) 1.54 D) cannot be determined from the given information

$E(x) = (.15)0 + (.18)1 + (.24)2 + (.07)3 + (.36)4$

(.15)0+(.18)1+(.24)2+(.07)3+(.36)4
2.31

Chapter 5

Questions 43-44: The lengths of pregnancies were normally distributed with a mean of 268 days and a standard deviation of 15 days.

$\mu_{\bar{x}} = 268$

$\sigma_{\bar{x}} = \frac{15}{\sqrt{36}} = 2.5$

43) If 36 women are randomly selected, find the probability that they have a mean pregnancy between 268 and 270 days. (Use the Central Limit Theorem.)

normalcdf(0,.8)
.2881446658

NORMCDF(0,0.8)

$z_{\bar{x}_1} = \frac{268-268}{2.5} = 0$

$z_{\bar{x}_2} = \frac{270-268}{2.5} = 0.8$

A) 0.7881 B) 0.2119 C) 0.2881 D) 0.5517

44) If 36 women are randomly selected, find the probability that they have a mean pregnancy longer than 270 days. (Use the Central Limit Theorem.)

A) 0.7881 B) 0.2119 C) 0.2881 D) 0.5517

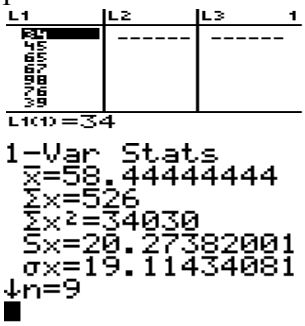
$z_{\bar{x}} = \frac{270-268}{2.5} = 0.8$

normalcdf(0.8,10)
.2118553337

NORMCDF(.8,10)

Questions 45-46: The following represents a random sample of the number of people in a subway station on a given day at 3 p.m.

34 45 65 67 98 76 39 47 55



45) Find a **point estimate** for the population mean, μ.
A) 58.44 B) 65.75 C) 19.11 D) 52.6

$\bar{x}$ IS A POINT ESTIMATE FOR μ

46) Find a **point estimate** for the population standard deviation, σ.
A) 19.11 B) 20.27 C) 58.44 D) 365.19

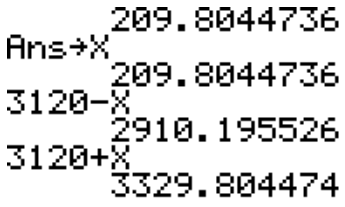
S_x IS A POINT ESTIMATE FOR σ.

47) In a school of 2,000 students, 20 random samples consisting of 15 students each are asked if they are Republican, Democrat, or neither. Which of the following are MOST LIKELY the results that will be obtained?
A) All 20 samples will yield the same totals of each answer; this is the best representation of the population totals
B) None of the 20 samples will yield the same totals of each answer; none of these is the best representation of the population totals
C) Some of the 20 samples may yield the same totals; the mean of these samples is the best representation of the population totals
D) None of the above

Chapter 6

48) What happens to the confidence interval if you increase the level of confidence?

A. stays the same
B. widens
C. narrows
D. cannot be determined

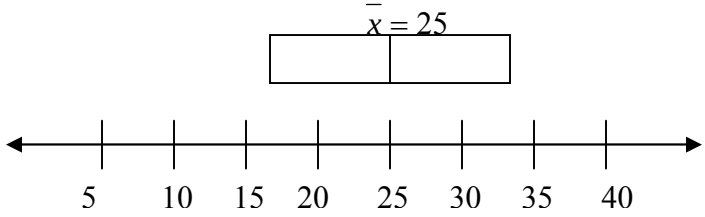


$E = z_c \frac{\sigma}{\sqrt{n}} = (1.96)\frac{677}{\sqrt{40}}$

49) A random sample of 40 students has a mean annual earnings of $3120 and a standard deviation of $677. Construct a 95% confidence interval for the population mean.
A) ($210, $110) B) ($2910, $3330) C) ($4812,$5342) D) ($1987,$2346)

dev of pop is 677

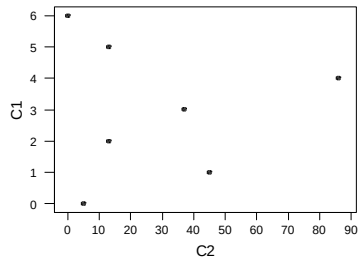
Question #50: Refer to the following 90% confidence box plot for a sample size of 35.



50) Which is the BEST interpretation of the above 90% confidence interval box plot?
A) There is a 90% chance that the population mean is 25.
B) You are 90% sure that the sample mean is between 17 and 34.
C) There is a 90% chance that the sample mean is 25.
D) You are 90% sure that the population mean is between 17 and 34.

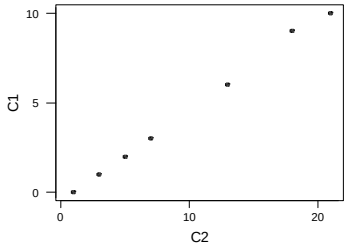
Chapter 9

51) Approximate the correlation coefficient for the following scatter plot:



A) $r \approx .9$ B) $r \approx -.7$
C) $r \approx -0.005$ D) $r = 1$

52) What type of relationship is represented in the following scatter plot?



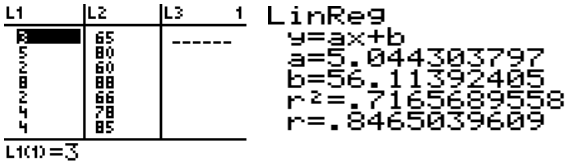
A) linear B) quadratic
C) cubic D) no relationship

Questions 53-55: The data below are final exam scores of 10 randomly selected students and the number of hours they studied for the exam.

Hours, x	3	5	2	8	2	4	4	5	6	3
Scores, y	65	80	60	88	66	78	85	90	90	71

53) Calculate the correlation coefficient for the data.

A) $r \approx .72$ B) $r \approx -.7$ C) $r \approx 0.85$ D) $r = 1$



54) Characterize/describe the correlation of the data.

A) strong negative linear correlation B) strong positive linear correlation
C) weak positive linear correlation D) no linear correlation

55) Using a least-squares line, predict the score of a student who studied for 7 hours.

A) 98.2 B) 5.044 C) 56.114 D) 91.4

$\hat{y} = 5.044(7) + 56.114$
≈ 91.42

56) If 5 is added to each person's score, what effect will it have on the correlation coefficient?

A) none B) decreases by 5 C) increases by 5 D) multiplied by 5

Questions 57-58: Use the data below.

x	1	2	3	5	6	8	9	10	12	13
y	3	9	19	53	73	130	163	200	289	339

57) Which of the following is the type of relationship that BEST fits the data?

A) linear B) quadratic C) cubic D) none of these

EITHER COULD BE CORRECT

58) What is the ~~correlation coefficient~~ for the data at its best type?

A) $r \approx -.72$ B) $r \approx .85$ C) $r \approx 0.99$ D) $r = .24$

COEFFICIENT OF DETERMINATION