Review for Midterm Exam

COLLECTED ON DAY OF EXAM!!!! WILL NOT BE ACCEPTED LATE. EXAM DATE is _____

Name TEACHER

Chapter 1 – Introduction to Statistics

1) A survey of 1103 students was taken from a university with 18,500 students. Does this value describe a population parameter or a sample statistic? Explain your reasoning. Statistic

2) The average salary of all General Motors workers is $33,000. Does this value describe a population parameter or a sample statistic? Explain your reasoning. Parameter

3) Classify the colors of automobiles on a used car lot as qualitative data or quantitative data.
A) qualitative data B) quantitative data

4) Classify the number of complaint letters received by the United States Postal Service in a given day as qualitative data or quantitative data.
A) qualitative data B) quantitative data

5) Identify the level of measurement for data that can be classified according to color.
A) ordinal B) interval C) ratio D) nominal

6) Identify the level of measurement for data that are the ratings of a movie ranging from poor to good to excellent.
A) interval B) ratio C) nominal D) ordinal

7) Identify the level of measurement for data that are the annual salaries for all teachers in California.
A) ratio B) nominal C) ordinal D) interval

8) Thirty-five sophomores, 35 juniors and 49 seniors are randomly selected from 230 sophomores, 280 juniors and 577 seniors at a certain high school. What sampling technique is used?
A) random B) cluster C) systematic D) convenience E) stratified

9) Every fifth teenager entering a concert is checked for possession of drugs. What sampling technique is used?
A) systematic B) convenience C) cluster D) random E) stratified

10) At a local community college, five statistics classes are randomly selected and all of the students from each class are interviewed. What sampling technique is used?
A) random B) stratified C) systematic D) convenience E) cluster

11) A community college student interviews everyone in a statistics class to determine who owns a car. What sampling technique is used?
A) convenience B) cluster C) stratified D) random E) systematic

12) A lobbyist for a major airspace firm assigns a number to each legislator and then uses a computer to randomly generate ten numbers. The lobbyist contacts the legislators corresponding to these numbers. What sampling technique was used?
A) stratified B) random C) systematic D) convenience E) cluster

Chapter 2 – Descriptive Statistics

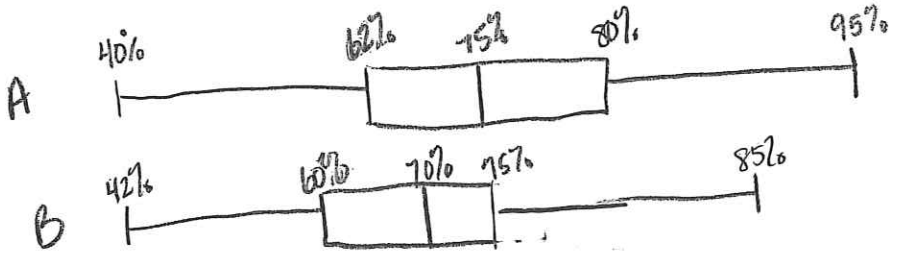
13) The following plot displays minutes of daily microfilm use at a library.

1	015	1 0 represents 10 minutes
2	378	
3	8899	
4	014566	
5	278	
6	5	

a) What was the longest daily use time? 65 min

b) What was the median use time? 39.5

14) The folowing box plot shows the final exam scores in algebra for students using two different textbooks.



a) What was the lowest score for a student using textbook A? 40%

b) What proportion of the students using Textbook A got less than 50%?

c) Fill in the blank: Half of the students using Textbook B got 70% percent or more on the final exam.

d) Which textbook gave students scores that varied less? Explain your answer.

B - smaller range, smaller IQR

e) Which textbook do you think is better? Why?

B - smaller range. smaller IQR

15) Identify the class width used in the frequency distribution.

Height (in inches)	Frequency
50 – 52	5
53 – 55	8
56 – 58	12
59 – 61	13
62 – 64	11

3

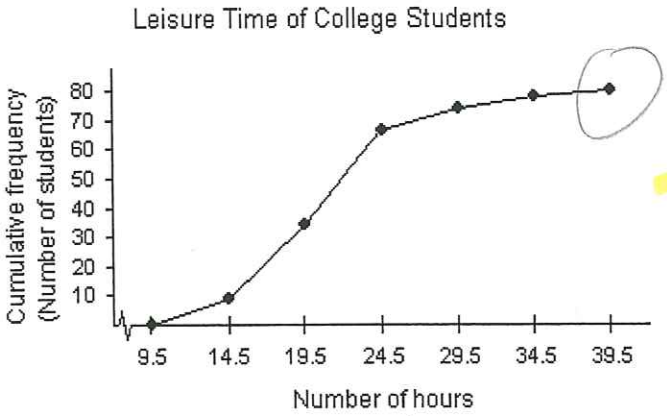
16) A city in the Pacific Northwest recorded its highest temperature at 74 degrees Fahrenheit and its lowest temperature at 23 degrees Fahrenheit for a particular year. Use this information to find the upper and lower limits of the first class if you wish to construct a frequency distribution with 10 classes.

74
-23
51 ÷ 10 = 5.1
6

23-28
29
35
41
47
53
59
65
71

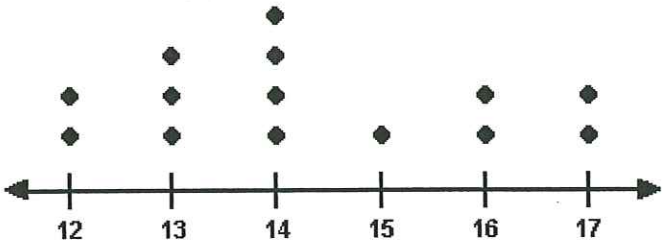
23
29

17) Use the ogive below to approximate the number in the sample.



80

18) For the dot plot below, what is the maximum and what is the minimum entry?



Max 17
Min 12

19) The top 14 speeds, in miles per hour, for Pro-Stock drag racing over the past two decades are listed below. Find the mean, median, and mode of the speeds.

* put in order

181.1	202.2	190.1	201.4	191.3	201.4	192.2
201.2	193.2	201.2	194.5	199.2	196.0	196.2

mean = 195.8 median = 196.1 mode = 201.4

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

Miles (per day)	Frequency
1–2	22
3–4	30
5–6	3
7–8	28
9–10	5
	88

1.5(22) = 33
3.5(30) = 105
5.5(3) = 16.5
7.5(28) = 210
9.5(5) = 47.5
412 ÷ 88 = 4.7

21) For the stem-and-leaf plot below, find the range of the data set.

1 | 4 5	1|4 = 14
2 | 6 6 6 7 8 9	
2 | 7 7 7 8 8 9 9 9	
3 | 0 1 1 2 3 4 4 5	
3 | 6 6 6 7 8 8 9	
4 | 0 0	

40 - 14 = 26

22) The heights (in inches) of 10 adult males are listed below. Find the sample standard deviation.

70 72 71 70 69 73 69 68 70 71

1.49 use formula

23) For the following data set, approximate the sample standard deviation of phone calls per day.

SD = 6.361 → use formula

Phone calls (per day)	Frequency
8–11	18
12–15	23
16–19	38
20–23	47
24–27	32

24) The test scores of 30 students are listed below. Find the five number summary

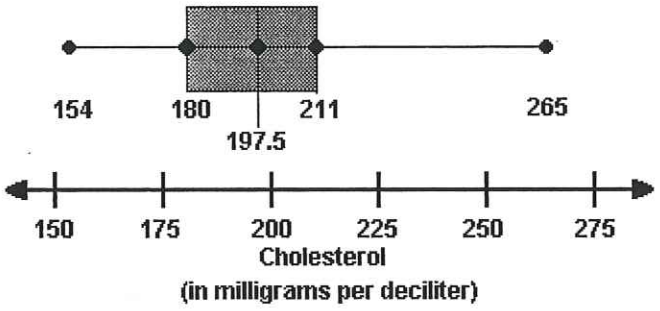
31 41 45 48 52 55 56 56 63 65
67 67 69 70 70 74 75 78 79 79
80 81 83 85 85 87 90 92 95 99

min 31 q_1 = 53.5 q_2 = 72 q_3 = 84 max = 99

25) Find the z-score for the value 88, when the mean is 95 and the standard deviation is 7.

$z = \frac{x - \mu}{\sigma} = \frac{88 - 95}{7} = -1$

26) Use the box-and-whisker plot below to determine which statement is accurate.



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 least 211.

Review of Probability - CH 3

Name_____

Solve the problem.

1) Which of the following cannot be a probability?

A) $\frac{\sqrt{5}}{3}$ B) -87 C) 0.001 D) 0

2) Rank the probabilities of 10%, $\frac{1}{5}$, and 0.06 from the least likely to occur to the most likely to occur.

.2

$\frac{1}{5}$, 10%, .06

3) Identify the sample space of the probability experiment: answering a multiple choice question with A, B, C, and D as the possible answers

A, B, C, D

4) A single six-sided die is rolled. Find the probability of rolling a number less than 3.

$P(x<3)$ $P(1) + P(2)$

$\frac{1}{6} + \frac{1}{6} = \frac{2}{6} = \frac{1}{3}$

5) A study of 1000 randomly selected flights of a major airline showed that 782 of the flights arrived on time. What is the probability of a flight arriving on time?

$\frac{782}{1000} = .782$

... a survey of college students, 880 said that they have cheated on an exam and 1721 said that they have not. If one college student is selected at random, find the probability that the student has cheated on an exam.

$\frac{880}{2601} = .33$

7) The distribution of blood types for 100 Americans is listed in the table. If one donor is selected at random, find the probability of selecting a person with blood type A+ or A−.

Blood Type	O+	O−	A+	A−	B+	B−	AB+	AB−
Number	37	6	34	6	10	2	4	1

$\frac{40}{100} = 40\%$ or .40

8) A group of students were asked if they carry a credit card. The responses are listed in the table.

Class	Credit Card Carrier	Not a Credit Card Carrier	Total
Freshman	24	36	60
Sophomore	37	3	40
Total	61	39	100

If a student is selected at random, find the probability that he or she owns a credit card given that the student is a freshman. Round your answer to three decimal places.

$\frac{24}{65} = .369$

9) Classify the events as dependent or independent.
The events of getting two aces when two cards are drawn from a deck of playing cards and the first card is replaced before the second card is drawn.

Independent

10) You are dealt two cards successively without replacement from a standard deck of 52 playing cards. Find the probability that the first card is a two and the second card is a ten. Round your answer to three decimal places.

$\frac{4}{52} \cdot \frac{4}{51} = .006$

11) Find the probability of answering the two multiple choice questions correctly if random guesses are made. Assume the questions each have five choices for the answer. Only one of the choices is correct.

$\frac{1}{5} \cdot \frac{1}{5} = \frac{1}{25}$

12) The probability it will rain is 40% each day over a three-day period. What is the probability it will rain at least one of the three days? $P(1) + P(2) + P(3)$

$x3(.4)(.6)(.6) + (.4)(.4)(.6)x3 + (.4)(.4)(.4)$

$.432 + .288 + .064 = .784$

13) Decide if the events A and B are mutually exclusive or not mutually exclusive. A card is drawn from a standard deck of 52 playing cards.
A: The result is a 7.
B: The result is a jack.

Mutually Exclusive

14) A card is drawn from a standard deck of 52 playing cards. Find the probability that the card is an ace or a king.

$\frac{4}{52} + \frac{4}{52} = \frac{8}{52} = \frac{2}{13}$

15) A card is drawn from a standard deck of 52 playing cards. Find the probability that the card is an ace or a black card.

$\frac{4}{52} + \frac{26}{52} = \frac{30}{52} = \frac{15}{26}$

The table lists the smoking habits of a group of college students.

Sex	Non-smoker	Regular Smoker	Heavy Smoker	Total
Man	135	46	5	186
Woman	187	21	11	219
Total	322	67	16	405

If a student is chosen at random, find the probability of getting someone who is a regular or heavy smoker. Round your answer to three decimal places.

$\frac{83}{405} = .205$

17) The access code to a house's security system consists of five digits. How many different codes are available if each digit can be repeated?

A) 100,000 B) 25 C) 40 D) 10,000

18) A delivery route must include stops at three cities. If the route is randomly selected, find the probability that the cities will be arranged in alphabetical order. Round your answer to three decimal places.

ABC
BAC BCA
CBA

$\frac{1}{3!} = \frac{1}{6} = .167$

19) The Environmental Protection Agency must visit nine factories for complaints of air pollution. In how many different ways can a representative visit five of these to investigate this week?

$_9P_5 = 15120$

20) How many ways can two Republicans, one Democrat, and one Independent be chosen from nine Republicans, five Democrats, and two Independents to fill four positions on city council?

$_9C_2 \cdot {}_5C_1 \cdot {}_2C_1$

$36 \times 5 \times 2 = 360$

Chapter 4 – Discrete Probability Distributions

27) An insurance actuary asked a sample of senior citizens the cause of their automobile accidents over a two-year period. The random variable x represents the number of accidents caused by their failure to yield the right of way. Use the frequency distribution to construct a probability distribution.

Accidents	0	1	2	3	4	5
Senior Citizens	4	3	12	3	2	1
	.16	.12	.48	.12	.08	.04

= 25

28) State whether the variable is discrete or continuous.
The number of cups of coffee sold in a cafeteria during lunch

A) discrete B) continuous

29) State whether the variable is discrete or continuous.
The temperature in degrees Fahrenheit on July 4th in Juneau, Alaska

A) discrete B) continuous

30) Determine whether the distribution represents a probability distribution. If not, identify any requirements that are not satisfied.

x	P(x)
1	0.2
2	0.2
3	0.2
4	0.2
5	0.2

each $P(x) < 1$ ✓

total = 1 ✓

31) Determine whether the distribution represents a probability distribution. If not, any requirements that are not satisfied.

x	P(x)
1	0.49
2	0.05
3	0.32
4	0.07
5	0.07

Each $p(x) \leq 1$ ✓

sum = 1 ✓

32) The random variable x represents the number of cars per household in a town of 1000 households. Find the probability of randomly selecting a household that has between one and three cars, inclusive.

Cars	Households
0	125
1	428
2	256
3	108
4	83

$792/1000 = .792$

33) Decide whether the experiment is a binomial experiment. If it is not, explain why. You roll a die 750 times. The random variable represents the number that appears on each roll of the die.

no succ. defined

not binomial

34) Decide whether the experiment is a binomial experiment. If it is not, explain why. Surveying 1000 prisoners to see whether they are serving time for their first offense. The random variable represents the number of prisoners serving time for their first offense.

35) A test consists of 10 multiple choice questions, each with five possible answers, one of which is correct. To pass the test a student must get 60% or better on the test. If a student randomly guesses, what is the probability that the student will pass the test?

36) According to police sources a car with a certain protection system will be recovered 85% of the time. Find the probability that 5 of 7 stolen cars will be recovered.

37) A recent survey found that 70% of all adults over 50 wear glasses for driving. In a random sample of 10 adults over 50, what is the probability that less than six wear glasses?

38) A company ships computer components in boxes that contain 20 items. Assume that the probability of a defective computer component is 0.2. Find the probability that the first defect is found in the seventh component tested.

39) The probability that a federal income tax return is filled out incorrectly with an error in favor of the taxpayer is 20%. What is the probability that when the ten tax returns are randomly selected for an audit, the first, second, or third return will contain only errors favoring the taxpayer?

40) A statistics professor finds that when he schedules an office hour at the 10:30 a.m. time slot, an average of three students arrives. Find the probability that in a randomly selected office hour no students will arrive.

41) A sales firm receives an average of four calls per hour on its toll-free number. For any given hour, find the probability that it will receive exactly nine calls. Use the Poisson distribution.

~~Chapter 5 – Normal Probability Distributions~~

42) The lengths of pregnancies of humans are normally distributed with a mean of 268 days and a standard deviation of 15 days. A baby is premature if it is born three weeks early. What percentage of babies are born prematurely?

43) The lengths of pregnancies of humans are normally distributed with a mean of 268 days and a standard deviation of 15 days. Find the probability of a pregnancy lasting more than 300 days.

44) An airline knows from experience that the distribution of the number of suitcases that get lost each week on a certain route is approximately normal with $\mu = 15.5$ and $\sigma = 3.6$. What is the probability that during a given week the airline will lose between 10 and 20 suitcases?

45) Assume that the heights of women are normally distributed with a mean of 63.6 inches and a standard deviation of 2.5 inches. The cheerleaders for a local professional basketball team must be between 65.5 and 68.0 inches. If a woman is randomly selected, what is the probability that her height is between 65.5 and 68.0 inches?

46) IQ test scores are normally distributed with a mean of 100 and a standard deviation of 15. Find the x-score that corresponds to a z-score of -1.645.

47) A mathematics professor gives two different tests to two sections of his college algebra courses. The first class has a mean of 56 with a standard deviation of 9 while the second class has a mean of 75 with a standard deviation of 15. A student from the first class scores a 62 on the test while a student from the second class scores an 83 on the test. Compare the scores.

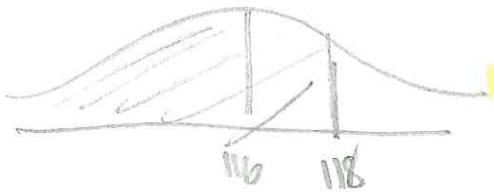
48) Assume that the heights of women are normally distributed with a mean of 64.9 inches and a standard deviation of 1.6 inches. Find Q_3, the third quartile that separates the bottom 75% from the top 25%.

49) Assume that blood pressure readings are normally distributed with a mean of 116 and a standard deviation of 4.8. If 36 people are randomly selected, find the probability that their mean blood pressure will be less than 118.

50) The average number of pounds of red meat a person consumes each year is 196 with a standard deviation of 22 pounds (Source: American Dietetic Association). If a sample of 50 individuals is randomly selected, find the probability that the mean of the sample will be greater than 200 pounds.

47) $\frac{62-56}{9} = .67$ ★ Butter $\quad \frac{83-75}{15} = .67$

48) $.67 = \frac{x-64.9}{1.6}$ $= 65.9$

49) 

use calc .6615

50) 

.427