Name: Date:

Statistics Midterm Review

Unit 1

. Determine whether each statement is true or false. If the statement is false, explain why.

a. Probability is used as a basis for inferential statistics. T

b. The height of President Lincoln is an example of a variable. F

c. The highest level of measurement is the interval level. F

d. When the population of college professors is divided into groups according to their rank (instructor, assistant professor, etc.) and then several are selected from each group to make up a sample, the sample is called a cluster sample. F

e. The variable *age* is an example of a qualitative variable. F

f. The weight of pumpkin is considered to be a continuous variable. T

g. The boundary of a value such as 6 inches would be 5.9-6.1 inches. F

Select the best answer:

2. The number of absences per year that a worker has is an example of what type of data?
   a) Nominal
   b) Qualitative
   c) Discrete
   d) Continuous

3. What are the boundaries of 25.6 ounces?
   a) 25-26 ounces
   b) 25.55-25.65 ounces
   c) 25.5-25.7 ounces
   d) ~~20-39~~ ounces
   25.1 - 26.1

4. A researcher divided subjects into two groups according to gender and then selected members from each group to her sample. What sampling method was the researcher using?
   a) Cluster
   b) Random
   c) Systematic
   d) stratified

5. Data that can be classified according to color are measured on what scale?
   a) Nominal
   b) Ratio
   c) Ordinal
   d) Interval

6. A study that involves no researcher intervention is called
   a) An experimental study
   b) A noninvolvement study
   c) An observational study
   d) A quasi-experimental study

7. A variable that interferes with other variables in the study is called
   a) A confounding variable
   b) An explanatory variable
   c) An outcome variable
   d) An interfering variable

8. The following set of data represents the number of hospitals for selected states. Find the mean, median, mode, midrange, range, variance, and standard deviation
53, 84, 28, 35, 111, 40, 60, 123, 87, 84

mean = 70.5
median = 72
mode = 84
midrange = 75.5
range = 95
variance = 1029.2
std dev = 32.1

9. In a dental survey of third-grade students, the distribution was obtained for the number of cavities found. Find the average number of cavities for the class. Use the weighted mean.

Number of students	Number of cavities
12	0
8	1
5	2
5	3

1.1

10. The number of years served by selected past members of the U.S. Supreme Court is listed below. Find the percentile rank for each value. Which value corresponds to the 40th percentile? Construct a boxplot for the data and comment on their shape.
19,15,16,24,17,4,3,31,23,5,33

40th percentile = 16
med = 17
$Q_1 = 5$
$Q_3 = 33$

11. The average delivery charge for a refrigerator is \$32. The standard deviation is \$4. Find the minimum percentage of data values that will fall in the range of \$20 to \$44. Use Chebyshev's theorem.

$k = 3$

89%

12. Which of these exam grades has a better relative position?

a. A grade of 82 on a test with $\bar{X} = 85$ and s = 6

b. A grade of 56 on a test with $\bar{X} = 60$ and s = 5

Unit 2

13. When two dice are rolled, find the probability of getting

a. A sum of 5 or 6 $9/36$

b. A sum greater than 9 $6/36$

c. A sum less than 4 or greater than 9 $9/36$

d. A sum that is divisible by 4 $9/36$

e. A sum of 14

0

f. A sum less than 13 $\frac{36}{36} = 1$

14. Roughly 1 in 6 students enrolled in higher education took at least one online course last fall. Choose 5 enrolled students at random. Find the probability that

a. All took 5 online courses

$\left(\frac{1}{6}\right)^5$

b. None of the 5 took a course online

$\left(\frac{5}{6}\right)^5$

c. At least 1 took an online course

$1 - \left(\frac{5}{6}\right)^5$

15. Of Americans using library services 67% borrow books. If 5 patrons are chosen at random, what is the probability that all borrowed books? That none borrowed books?

all → .135

none → .0039

16. Three cards are drawn from an ordinary deck *without* replacement. Find the probability of getting

a. All black cards

.117

b. All spades

.0129

c. All queens

.00018

17. A manufacturer makes three models of a television set, models A, B, and C. A store tells 40% of model A sets, 40% of model B sets, and 20% of model C sets. Of model A sets, 3% have stereo sound; of model B sets, 7% have stereo sound; of model C sets, 9% have stereo sound. If a set is sold at random, find the probability that it has stereo sound.

6%

18. The probability that it snows and the bus arrives late is 0.023. Jose hears the weather forecast, and there is a 40% chance of snow tomorrow. Find the probability that the bus will be late, given that it snows.

.0575 = 5.8%

19. At a large factory, the employees were surveyed and classified according to their level of education and whether they smoked. The data are shown in the table.

Educational Level

Smoking habit	Not high school graduate	High school graduate	College graduate
Smoke	6	14	19
Do not smoke	18	7	25

If an employee is selected at random, find these probabilities.

a. The employee smokes, given that he or she graduated from college.

.43

b. Given that the employee did not graduate from high school, he or she is a smoker.

.25

20. How many different ways can 8 computer operators be seated in a row?

40320

21. How many ways can a student select 2 electives from a possible choice of 10 electives?

45

22. There are 6 Republican, 5 Democrat, and 4 Independent candidates. How many different ways can a committee of 3 Republicans, 2 Democrats, and 1 Independent be selected?

800

23. A newspaper advertises 5 different movies, 3 plays, and 2 baseball games for the weekend. If a couple selects 3 activities, find the probability that they attend 2 plays and 1 movie.

.125

24. During a recent paint sale at Corner Hardware, the number of cans of paint purchased was distributed as shown. Find the mean, variance, and standard deviation of the distribution.

Number of cans X	1	2	3	4	5
Probability P(X)	0.42	0.27	0.15	0.10	0.06

$\mu = 2.11$

$\sigma^2 = 1.45$ or 1.5

$\sigma = 1.2$

25. Let x be a binomial random variable with n = 12 and p = 0.3. Find the following:

a. P(X = 8) .008

b. P(X < 5) .71

c. P(X ≥ 10) .0002

d. P(4 < X ≤ 9) .275

26. Fourteen percent of cell phone users use their cell phones to access the Internet. In a random sample of 10 cell phone users, what is the probability that exactly 2 have used their phones to access the Internet? More than 2?

exactly 2 = .263

more than 2 = .156

Unit 3

27. The average individual monthly spending in the United States for paging and messaging services is $10.15. If the standard deviation is $2.45 and the amounts are normally distributed, what is the probability that a randomly selected use of these services pays more than $15.00 per month? Between $12.00 and $14.00 per month?

more than $15 = .0239

between $12 and $14 = .1654

28. Americans ate an average of 25.7 pounds of confectionary products each last year and spent an average of $61.50 per person doing so. If the standard deviation for consumption is 3.75 pounds and the standard deviation for the amount spent is $5.89, find the following:

a. The probability that the sample mean confectionery consumption for a random sample of 40 American consumers was greater than 27 pounds.

.0143

b. The probability that for a random sample of 50, the sample mean for confectionary spending exceeded $60.00.

.9641

29. Find the area under the standard normal curve for the following:

a) to the left of 0.05

.5199

b) to the right of -1.72

.9573

c) between 0.76 and 1.98

.1997

Honors only 30 and 31:

30. According to the government 5.3% of those employed are multiple-job holders. In a random sample of 150 people who are employed, what is the probability that fewer than 10 hold multiple jobs?

.7157

31. In a large university, 30% of the incoming first-year students elect to enroll in a personal finance course offered by the university. Find the probability that of 800 randomly selected incoming first-year students, at least 260 have elected to enroll in the course.

.0668