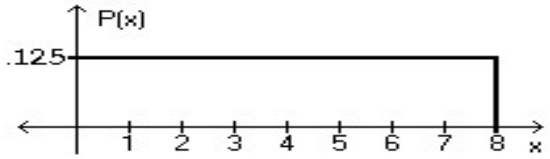
TMATYC
STATISTICS EXAM
Fall 2010

1. Five hundred residents of a city are polled to obtain information on voting intentions in an upcoming city election. The five hundred residents in this study is an example of a(n)
A. Census B. Sample C. Observation D. Population

2. Assume that the weight loss for the first month of a diet program varies between 0 pound and 8 pounds so that there is the following uniform density curve.



Find the probability for a weight loss greater than 3.2 pounds?
A. 0.5500 B. 0.4750 C. 0.6000 D. 0.7250

3. A probability distribution showing the probability of x successes in n trials, where the probability of success does not change from trial to trial, is termed a
A. uniform probability distribution B. binomial probability distribution
C. hypergeometric probability distribution D. normal probability distribution

4. Which of the following is a required condition for a discrete probability function?
A. $\sum f(x) = 0$ B. $f(x) \geq 1$ for all values of x
C. $f(x) < 0$ D. $\sum f(x) = 1$

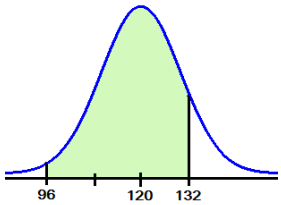
5. The incomes of students at a local mill are normally distributed with a mean of $1100 and a standard deviation of $150. What percentage of students earns less than $900 a month?
A. 9.18% B. 35.31% C. 40.82% D. 90.82%

6. In one region, the September energy consumption levels for single-family homes are found to be normally distributed with a mean of 1050kWh. and a standard deviation of 218kWh. If 50 different homes are randomly selected, find the probability that their mean energy consumption level for September is greater than 1075 kWh.
A. 0.0438 B. 0.2090 C. 0.2910 D. 0.4562

7. Human body temperatures have a mean of 98.20° F. Sally's temperature is 99° F and it can be described by the z-score 1.60. What is the standard deviation of human body temperatures?

A. -0.8° F B. 0.5° F C. 0.8° F D. 2° F

8. The systolic blood pressure of 18-year-old women has a bell shape distribution with a mean of 120 mmHg and a standard deviation of 12 mmHg. ***Use Empirical Rule*** to determine the percentage of 18-year-old women have a systolic blood pressure between 96 mmHg and 132 mmHg?



A. 68.0% B. 77.5% C. 81.5% D. 81.8%

9. Which is better, a score of 92 on a test with a mean of 71 and a standard deviation of 15, or a score of 688 on a test with a mean of 493 and a standard deviation of 150?

A. A score of 688 B. A score of 92
C. Both scores have the same relative position. D. Incomparable

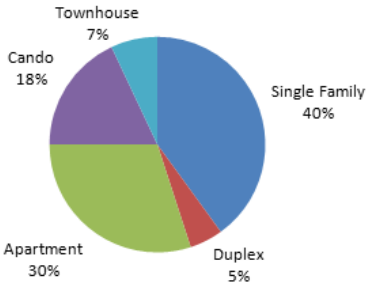
10. The number of electrical outages in a city varies from day to day. Assume that the number of electrical outages (x) in the city has the following probability distribution.

x	f(x)
0	0.80
1	0.15
2	0.04
3	0.01

The mean and the standard deviation for the number of electrical outages (respectively) are

A. 2.6 and 5.77 B. 0.26 and 0.577 C. 0.15 and 0.83 D. 1.5 and 8.3

11. The pie chart shows the current total population of a city living in the given types of housing. If there are 39,100 people living in Duplex or Cando, what is the current population size of this city?



A. 170,000 B. 217,000
C. 326,000 D. 782,000

12. What requirements are necessary for a normal probability distribution to be a standard normal probability distribution?

A. $\mu = 1$ and $\sigma = 1$ B. $\mu = 1$ and $\sigma = 0$

C. $\mu = 0$ and $\sigma = 1$ D. $\mu = 0$ and $\sigma = 0$

13. A production process produces 2% defective parts. A sample of five parts from the production process is selected. What is the probability that the sample contains exactly two defective parts?

A. 0.0004 B. 0.0038 C. 0.02 D. 0.1

14. The student body of a large university consists of 60% female students. A random sample of 8 students is selected. What is the probability that among the students in the sample more than 3 are female?

A. 0.1239 B. 0.1737 C. 0.8263 D. 0.8761

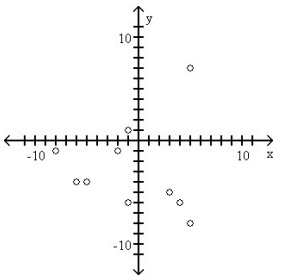
15. Suppose that from a population of 100 bank accounts, we want to take a random sample of four accounts in order to learn about the population. How many different random samples of four accounts are possible?

A. 400 B. 3,921,225 C. 94,109,400 D. 100,000,000

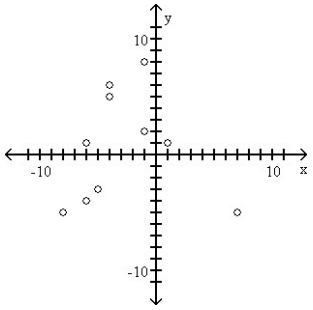
16. Use the given paired data to construct a scatter plot.

x	-5	-4	-1	-8	-6	1	-6	7	-4	-1
y	3	-6	-8	5	4	-1	-1	5	-5	-2

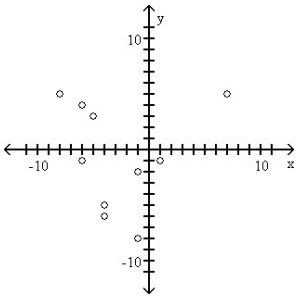
A.



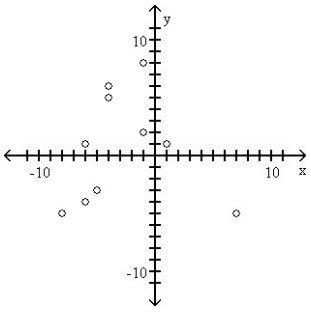
B.



C.



D.



17. You are dealt two cards successively (without replacement) from a shuffled deck of 52 playing cards. Find the probability that both cards are black. Express your answer as a simplified fraction.

A. $\frac{25}{102}$ B. $\frac{1}{4}$ C. $\frac{26}{53}$ D. $\frac{1}{2}$

18. In a survey, 26 voters were asked their ages. The results are shown below. A student wants to construct a histogram to represent the data. (with 5 classes beginning with a lower class limit of 19.5) What should be the class width?

43	56	28	63	67	66	52	48	37	51	40	60	62
66	45	21	35	49	32	53	61	53	69	31	48	59

A. 7 B. 8 C. 9 D. 10

19. In a poll, respondents were asked whether they had ever been in a car accident. 417 respondents indicated that they had been in a car accident and 454 respondents said that they had not been in a car accident. If one of these respondents is randomly selected, what is the probability of getting someone who has been in a car accident?

A. 0.4788 B. 0.4795 C. 0.5205 D. 0.5212

20. A card is drawn from a well-shuffled deck of 52 cards. What is the probability of drawing a club or a 9?

A. $\frac{2}{13}$ B. $\frac{1}{4}$ C. $\frac{17}{52}$ D. $\frac{4}{13}$

21. Which of the following statements concerning the linear correlation coefficient are true?

I. If the linear correlation coefficient for two variables is zero, then there is no relationship between the variables.
II. If the slope of the regression line is negative, then the linear correlation coefficient is negative.
III. The value of the linear correlation coefficient always lies between -1 and 1.
IV. A linear correlation coefficient of 0.62 suggests a stronger linear relationship than a linear correlation coefficient of -0.82.

A. I and II B. I and IV C. II and III D. III and IV

22. A large company wants to evaluate how many sick days per year employees take on average. The company constructs a 95% confidence interval based on a random sample of 550 employees. The given interval is (16.8, 17.4). What is the sample mean times the population standard deviation?

A. 34.2 B. 61.4 C. 62.0 D. 73.1

23. Applicants for a particular job, which involves extensive travel in Spanish speaking countries, must take a proficiency test in Spanish. The sample data below were obtained in a study of the relationship between the numbers of years applicants have studied Spanish (x) and their score on the test (y).

X	3	4	4	2	5	3	4	5	3	2
Y	57	78	72	58	89	63	73	84	75	48

Use this data and what you know about linear regression to predict the score of a person who has studied Spanish for 6 years.

A. 70 B. 85 C. 90 D. 97

24. In a hypothesis test, the claim is $p \neq .75$ and the test statistic is $z = 1.81$. If the significance level is 5%, which of the following is correct?

A. p-value of 0.0351 indicates that there is sufficient evidence to support the claim
B. p-value of 0.0351 indicates that there is not sufficient evidence to support the claim
C. p-value of 0.0702 indicates that there is sufficient evidence to support the claim
D. p-value of 0.0702 indicated that there is not sufficient evidence to support the claim

25. A 90% confidence interval is constructed for the proportion of children under 10 years old who believe in Santa Claus. The reported interval is (.423, .505). Which of the following statements do we know to be true?

A. Between 42.3% and 50.5% of children aged under 10 years old believe in Santa Claus.
B. If 100 confidence intervals were constructed using the same process, we would expect 90 of them to actually contain p.
C. There is a 90% chance that p is in the given interval.
D. Both A. and C.