

Midterm # 1
B

Name _____ PID _____ Section # (enrolled) _____

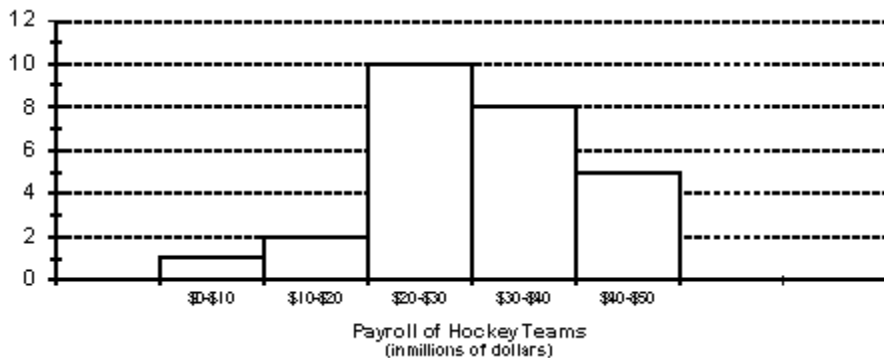
- * ***The exam is closed book and 80 minutes.***
- * ***You may use a calculator and the formula sheet that you brought to the exam.***
- * ***Table for the standard normal distribution is attached.***
- * ***The exam has 40 multiple choice questions. Each question is 2.5 points. Total points possible for this exam is 100.***
- * ***Answers recorded on the scatron and not on the test paper are the basis for scoring the exam. Use a pencil to mark your scatron.***
- * ***Turn in your scatron when you exit the room. You may keep your exam paper and formula sheet.***

- 1) It a recent study of college students indicated that 30% of all college students had at least one tattoo. 1) _____
A small private college decided to randomly and independently sample 15 of their students and ask if they have a tattoo. Let x be the binomial random variable which is the number of students having at least one tattoo. Find the probability that exactly 5 of the students reported that they did have at least one tattoo.
A) 0.722 B) 0.515 C) 0.207 D) 0.218
- 2) Parking at a large university has become a very big problem. University administrators are interested in determining the average parking time (e.g. the time it takes a student to find a parking spot) of its students. An administrator inconspicuously followed 250 students and carefully recorded their parking times. Identify the variable of interest to the university administration. 2) _____
A) the parking time, defined to be the amount of time the student spent finding a parking spot
B) the entire set of students that park at the university
C) the 250 students that data was collected from
D) a single student that parks at the university
- 3) When Scholastic Achievement Test scores (SATs) are sent to test-takers, the percentiles associated with scores are also given. Suppose a test-taker scored at the 87th percentile on the verbal part of the test and at the 14th percentile on the quantitative part. Interpret these results. 3) _____
A) This student performed better than 87% of the other test-takers on the verbal part and better than 14% on the quantitative part.
B) This student performed better than 13% of the other test-takers on the verbal part and better than 86% on the quantitative part.
C) This student performed better than 13% of the other test-takers on the verbal part and better than 14% on the quantitative part.
D) This student performed better than 87% of the other test-takers on the verbal part and better than 86% on the quantitative part.
- 4) The diameters of ball bearings produced in a manufacturing process can be described using a uniform distribution over the interval 2.5 to 4.5 millimeters. What is the mean diameter of ball bearings produced in this manufacturing process? 4) _____
A) 4.0 millimeters B) 3.0 millimeters C) 3.5 millimeters D) 4.5 millimeters

5) A sample of 100 weights has $Q_1 = 150$ lbs, $Q_2 = 165$ lbs and $Q_3 = 190$ lbs. The three largest weights in the sample are 230 lbs, 241 lbs and 275 lbs. The upper (right) whisker of the boxplot of the data extends to what value? 5) _____

- A) 250 B) 241 C) 230 D) 190

6) The payroll amounts for all teams in an international hockey league are shown below using a graphical technique from chapter 2 of the text. How many of the hockey team payrolls exceeded \$20 million (Note: Assume that no payroll was exactly \$20 million)? 6) _____



- A) 18 teams B) 10 teams C) 23 teams D) 8 teams

7) The Fresh Oven Bakery knows that the number of pies it can sell varies from day to day. The owner believes that on 50% of the days she sells 100 pies. On another 25% of the days she sells 150 pies, and she sells 200 pies on the remaining 25% of the days. To make sure she has enough product, the owner bakes 200 pies each day at a cost of \$2 each. Assume any pies that go unsold are thrown out at the end of the day. If she sells the pies for \$5 each, find the probability distribution for her daily profit. 7) _____

- A)

Profit	$P(\text{profit})$
\$300	.5
\$550	.25
\$800	.25

 B)

Profit	$P(\text{profit})$
\$100	.5
\$350	.25
\$600	.25
- C)

Profit	$P(\text{profit})$
\$300	.5
\$450	.25
\$600	.25

 D)

Profit	$P(\text{profit})$
\$500	.5
\$750	.25
\$1000	.25

8) The school newspaper surveyed 100 commuter students and asked two questions. First, students were asked how many courses they were currently enrolled in. Second, the commuter students were asked to estimate how long it took them to drive to campus. Considering these two variables, number of courses would best be considered a _____ variable and drive time would be considered a _____ variable. 8) _____

- A) discrete; continuous B) continuous; discrete
 C) discrete; discrete D) continuous; continuous

9) A local country club has a membership of 600 and operates facilities that include an 18-hole championship golf course and 12 tennis courts. Before deciding whether to accept new members, the club president would like to know how many members regularly use each facility. A survey of the membership indicates that 57% regularly use the golf course, 48% regularly use the tennis courts, and 9% use both of these facilities regularly. Given that a randomly selected member uses the tennis courts regularly, find the probability that they also use the golf course regularly. 9) _____

- A) .7164 B) .1343 C) .4737 D) .1875

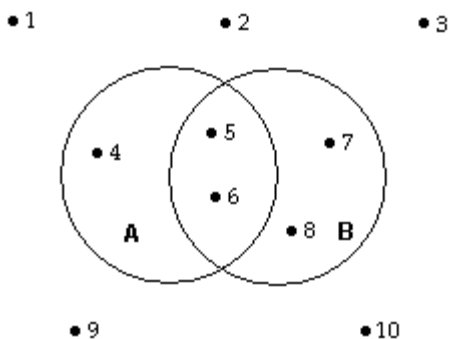
- 10) At the U.S. Open Tennis Championship a statistician keeps track of every serve that a player hits during the tournament. The statistician reported that the mean serve speed of a particular player was 100 miles per hour (mph) and the standard deviation of the serve speeds was 8 mph. Using the z-score approach for detecting outliers, which of the following serve speeds would represent outliers in the distribution of the player's serve speeds? 10) _____

Speeds: 72 mph, 108 mph, and 116 mph

- A) 72 is the only outlier.
- B) 72 and 108 are both outliers, but 116 is not.
- C) None of the three speeds is an outlier.
- D) 72, 108, and 116 are all outliers.

- 11) The accompanying Venn diagram describes the sample space of a particular experiment and events A and B. Suppose $P(1) = P(2) = P(3) = P(4) = \frac{1}{16}$ and $P(5) = P(6) = P(7) = P(8) = P(9) = P(10) = \frac{1}{8}$. 11) _____

Find $P(A)$ and $P(B)$.



- A) $P(A) = .25$; $P(B) = .5$
- B) $P(A) = .0625$; $P(B) = .25$
- C) $P(A) = .3125$; $P(B) = .5$
- D) $P(A) = .3125$; $P(B) = .25$

- 12) The amount spent on textbooks for the fall term was recorded for a sample of five university students - \$400, \$350, \$600, \$525, and \$450. Calculate the value of the sample standard deviation for the data. 12) _____

- A) \$450
- B) \$99.37
- C) \$98.75
- D) \$250

- 13) The tread life of a particular brand of tire is a random variable best described by a normal distribution with a mean of 60,000 miles and a standard deviation of 3000 miles. What warranty should the company use if they want 96% of the tires to outlast the warranty? 13) _____

- A) 54,750 miles
- B) 57,000 miles
- C) 63,000 miles
- D) 65,250 miles

- 14) A sociologist recently conducted a survey of senior citizens who have net worths too high to qualify for Medicaid but have no private health insurance. The ages of the 25 uninsured senior citizens were as follows: 14) _____

72	77	70	80	90
78	65	93	69	94
73	96	80	66	85
67	72	85	74	77
64	91	79	68	86

Find the median of the observations.

- A) 78
- B) 74
- C) 77.5
- D) 77

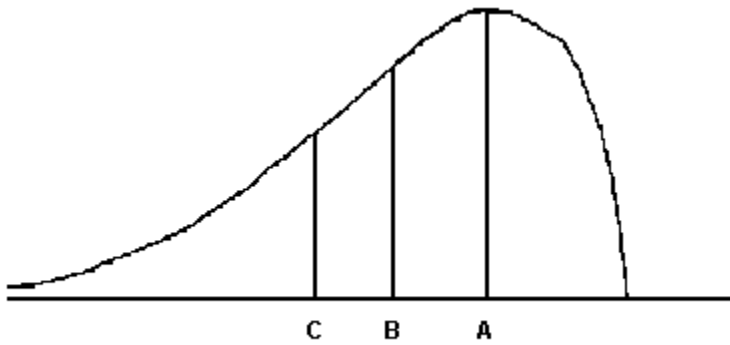
- 15) Given that x is a hypergeometric random variable with $N = 8$, $n = 4$, and $r = 3$, compute the standard deviation of x . 15) _____
 A) .538 B) .700 C) .732 D) .469
- 16) Suppose the candidate pool for two appointed positions includes 6 women and 9 men. All candidates were told that the positions were randomly filled. Find the probability that two men are selected to fill the appointed positions. 16) _____
 A) .360 B) .160 C) .343 D) .143
- 17) Suppose the probability of an athlete taking a certain illegal steroid is 10%. A test has been developed to detect this type of steroid and will yield either a positive or negative result. Given that the athlete has taken this steroid, the probability of a positive test result is 0.995. Given that the athlete has not taken this steroid, the probability of a negative test result is 0.992. Given that a positive test result has been observed for an athlete, what is the probability that they have taken this steroid? 17) _____
 A) 0.9552 B) 0.9325 C) 0.9928 D) 0.0995
- 18) A survey was conducted to determine how people feel about the quality of programming available on television. Respondents were asked to rate the overall quality from 0 (no quality at all) to 100 (extremely good quality). The stem-and-leaf display of the data is shown below. 18) _____

Stem	Leaf
3	1 6
4	0 3 4 7 8 9 9 9
5	0 1 1 2 3 4 5
6	1 2 5 6 6
7	1 4
8	
9	5

- Calculate the value of the sample mean for the data given in the stem-and-leaf display?
 A) 54.48 B) 54.70 C) 55.46 D) 52.79
- 19) Suppose x is a uniform random variable with $c = 20$ and $d = 80$. Find $P(x > 38)$. 19) _____
 A) 0.3 B) 0.1 C) 0.7 D) 0.9
- 20) A small computing center has found that the number of jobs submitted per day to its computers has a distribution that is approximately mound-shaped and symmetric, with a mean of 85 jobs and a standard deviation of 5. Where do we expect approximately 95% of the distribution to fall? 20) _____
 A) between 95 and 100 jobs per day B) between 75 and 95 jobs per day
 C) between 80 and 90 jobs per day D) between 70 and 100 jobs per day
- 21) A(n) _____ is the most basic outcome of an experiment. 21) _____
 A) sample point B) sample space C) event D) experiment
- 22) At the U.S. Open Tennis Championship a statistician keeps track of every serve that a player hits during the tournament. The statistician reported that the mean serve speed of a particular player was 105 miles per hour (mph) and the standard deviation of the serve speeds was 9 mph. If nothing is known about the shape of the distribution, give an interval that will contain the speeds of at least eight-ninths of the player's serves. 22) _____
 A) 87 mph to 123 mph B) 69 mph to 141 mph
 C) 78 mph to 132 mph D) 132 mph to 159 mph

23)

23) _____



For the distribution drawn here, identify the mean, median, and mode.

- A) A = median, B = mode, C = mean
 B) A = mode, B = median, C = mean
 C) A = mean, B = mode, C = median
 D) A = mode, B = mean, C = median

24) A music store has 8 male and 12 female employees. Suppose one employee is selected at random and the employee's gender is observed. List the sample points for this experiment, and assign probabilities to the sample points.

24) _____

- A) {male, female}; $P(\text{male}) = .4$ and $P(\text{female}) = .6$
 B) {8, 12}; $P(8) = .5$ and $P(12) = .6$
 C) {8, 12}; $P(8) = .8$ and $P(12) = .12$
 D) {male, female}; $P(\text{male}) = .8$ and $P(\text{female}) = .12$

25) A sociologist recently conducted a survey of citizens over 60 years of age who have net worths too high to qualify for Medicaid but have no private health insurance. The ages of the 25 uninsured senior citizens were as follows:

25) _____

68 73 66 76 86 74 61 89 65 90 69 92 76
 62 81 63 68 81 70 73 60 87 75 64 82

Find the upper quartile (Q3) of the data.

- A) 73
 B) 92
 C) 65.5
 D) 81.5

26) At a community college with 500 students, 120 students are age 30 or older. Find the probability that a randomly selected student is less than 30 years old.

26) _____

- A) .24
 B) .30
 C) .76
 D) .12

27) An assembly line is operating satisfactorily if fewer than 5% of the phones produced per day are defective. To check the quality of a day's production, the company randomly samples 50 phones from a day's production to test for defects. Define the population of interest to the manufacturer.

27) _____

- A) all the phones produced during the day in question
 B) the 50 phones sampled and tested
 C) the 5% of the phones that are defective
 D) the 50 responses: defective or not defective

28) A recent survey found that 61% of all adults over 50 wear glasses for driving. In a random sample of 70 adults over 50, what is the mean and standard deviation of the number who wear glasses? Round to the nearest hundredth when necessary.

28) _____

- A) mean: 27.3; standard deviation: 4.08
 B) mean: 27.3; standard deviation: 6.53
 C) mean: 42.7; standard deviation: 6.53
 D) mean: 42.7; standard deviation: 4.08

- 36) Each manager of a corporation was rated as being either a good, fair, or poor manager by his/her boss. The manager's educational background was also noted. The data appear below: 36) _____

Manager Rating	Educational Background				Totals
	H. S. Degree	Some College	College Degree	Master's or Ph.D.	
Good	2	3	21	13	39
Fair	6	19	45	17	87
Poor	4	8	7	15	34
Totals	12	30	73	45	160

What is the probability that a randomly chosen manager is either a good managers or has an advanced degree (Master's or PhD)?

- A) $\frac{71}{160}$ B) $\frac{13}{160}$ C) $\frac{21}{40}$ D) $\frac{147}{160}$
- 37) On a given day, the price of a gallon of milk had a mean price of \$2.16 with a standard deviation of \$0.07. A particular food store sold milk for \$2.09/gallon. Interpret the z-score for this gas station. 37) _____
- A) The milk price of this food store falls 1 standard deviation below the milk gas price of all food stores.
 B) The milk price of this food store falls 1 standard deviation above the mean milk price of all food stores.
 C) The milk price of this food store falls 7 standard deviations above the mean milk price of all food stores.
 D) The milk price of this food store falls 7 standard deviations below the mean milk price of all food stores.

- 38) Which of the following statements is not true? 38) _____
- A) If 25% of your statistics class is sophomores, then in a pie chart representing classifications of the students in your statistics class the slice assigned to sophomores is 90°
 B) Standardized values have mean zero and variance one.
 C) In skewed distributions, the mean is the best measure of the center of the distribution since it is least affected by extreme observations.
 D) Standard deviaiton is preffered over variance since it has the same unit with data.

- 39) The amount of soda a dispensing machine pours into a 12-ounce can of soda follows a normal distribution with a mean of 12.30 ounces and a standard deviation of 0.20 ounce. Each can holds a maximum of 12.50 ounces of soda. Every can that has more than 12.50 ounces of soda poured into it causes a spill and the can must go through a special cleaning process before it can be sold. What is the probability that a randomly selected can will need to go through this process? 39) _____
- A) .1587 B) .8413 C) .6587 D) .3413

- 40) The five-number summary of credit hours for 24 students in a statistics class is: 40) _____

Min	Q1	Median	Q3	Max
13.0	15.0	16.5	18.0	22.0

Which statement is true?

- A) There are no outliers in the data.
 B) There is at least one high outlier in the data.
 C) There is at least one low outlier in the data.
 D) There are both low and high outliers in the data.

Answer Key

Testname: MIDTERM-1-B

- 1) C
- 2) A
- 3) A
- 4) C
- 5) B
- 6) C
- 7) B
- 8) A
- 9) D
- 10) A
- 11) C
- 12) B
- 13) A
- 14) D
- 15) C
- 16) C
- 17) B
- 18) A
- 19) C
- 20) B
- 21) A
- 22) C
- 23) B
- 24) A
- 25) D
- 26) C
- 27) A
- 28) D
- 29) D
- 30) B
- 31) A
- 32) A
- 33) B
- 34) B
- 35) D
- 36) A
- 37) A
- 38) C
- 39) A
- 40) A