

Name _____

Date _____

Midterm Review #3

- 1) The average outstanding bill for delinquent customer accounts for a national department store chain is \$187.50 with a standard deviation of \$54.50. In a simple random sample of 50 delinquent accounts, what is the probability that the mean outstanding bill is over \$200?
- (A) .0526
 - (B) .0667
 - (C) .4090
 - (D) .5910
 - (E) .9474
- 2) An automobile service station performs oil changes and tire replacements, as well as other services. Sixty percent of its customers request an oil change, 30 percent request tire replacements, and 10 percent request both. A customer requests an oil change. What is the probability this customer does not request tire replacements?
- (A) 0.420
 - (B) 0.500
 - (C) 0.700
 - (D) 0.833
 - (E) 0.857
- 3) A medicine is known to produce side effects in one in five patients taking it. Suppose a doctor prescribes the medicine to four unrelated patients. What is the probability that none of the patients will develop side effects?
- (A) 0.8000
 - (B) 0.4096
 - (C) 0.2500
 - (D) 0.2000
 - (E) 0.0016

- 4) In the jury pool available for this week, 30 percent of potential jurors are women. A particular trial requires that, out of a jury of 12, at least three are women. If a jury of 12 is to be selected at random from the pool, what is the probability it meets the requirements of this trial?
- (A) 0.168
 - (B) 0.843
 - (C) 0.915
 - (D) 0.949
 - (E) The answer cannot be determined without knowing the size of the jury pool.
- 5) A school committee member is lobbying for an increase in the gasoline tax to support the county school system. The local newspaper conducted a survey of county residents to assess their support for such an increase. What is the population of interest here?
- (A) All school-aged children
 - (B) All county residents
 - (C) All county residents with school-aged children
 - (D) All county residents with children in the county school system
 - (E) All county school system teachers
- 6) A manufacturer of ready-bake cake mixes is interested in designing an experiment to test the effects of four different temperature levels (300°, 325°, 350°, and 375°F), two different types of pans (glass and metal), and three different types of ovens (gas, electric, and microwave) on the texture of its cakes, in all combinations. Which of the following below is the best description of the design of the necessary experiment?
- (A) A completely randomized design with nine treatment groups
 - (B) A completely randomized design with 24 treatment groups
 - (C) A randomized block design, blocked on temperature, with six treatment groups
 - (D) A randomized block design, blocked on type of pan, with 12 treatment groups
 - (E) A randomized block design, blocked on type of oven, with eight treatment groups
- 7) According to the central limit theorem, the sample mean \bar{X} is approximately normally distributed
- (A) for a large sample, regardless of the distribution of random variable X
 - (B) for a large sample, provided the random variable X is normally distributed
 - (C) regardless of the sample size
 - (D) for a small sample, regardless of the distribution of random variable X
 - (E) for a small sample, provided the random variable X is normally distributed

8) Two dice are rolled simultaneously. If both dice show 6, then the player wins \$20; otherwise the player loses the game. It costs \$2.00 to play the game. What is the expected gain or loss per game?

- (A) The player will gain about \$0.55.
- (B) The player will gain about \$1.44.
- (C) The player will lose about \$0.55.
- (D) The player will lose about \$1.44.
- (E) The player will lose about \$2.00.

9) Suppose that 35% of all business executives are willing to switch companies if offered a higher salary. If a headhunter randomly contacts an SRS of 100 executives, what is the probability that over 40% will be willing to switch companies if offered a higher salary?

- (A) .1469
- (B) .1977
- (C) .4207
- (D) .8023
- (E) .8531

10) The probability that Ted enrolls in an English class is $\frac{1}{3}$. If he does enroll in an English class, the probability that he enrolls in a mathematics class is $\frac{1}{5}$. If he does not enroll in an English class, the probability that he enrolls in a mathematics class is $\frac{3}{5}$. If we learn that Ted enrolled in a mathematics class, what is the probability that he enrolled in an English class?

- (A) 0.067
- (B) 0.143
- (C) 0.250
- (D) 0.333
- (E) 0.500

11) For which of these is a binomial probability model most reasonable?

- (A) The number of times, out of 10 attempts, that a particular child can throw a ball into a basket from six feet away
- (B) The colors of the cars in the parking lot of a particular grocery store on a randomly selected Sunday
- (C) The number of times that a randomly selected resident of California has visited a museum in the last 12 months
- (D) The number of cards drawn from a well-shuffled deck until all four aces are found
- (E) The number of people surveyed until someone who owns a parrot is found

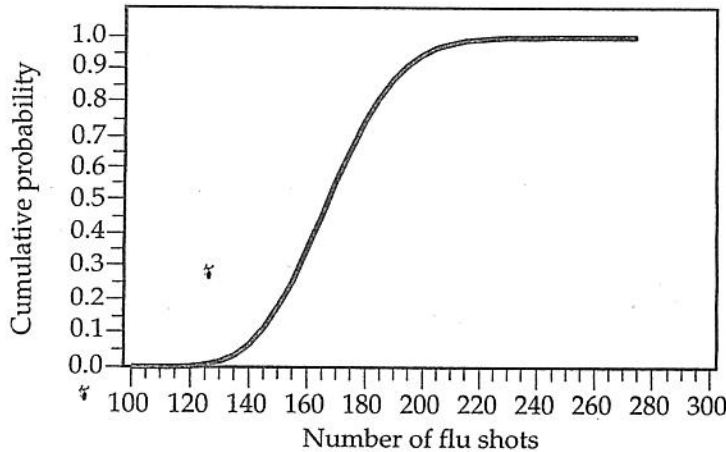
12) A publisher used standard boxes for shipping books. The mean weight of books packed per box is 25 pounds, with a standard deviation of two pounds. The mean weight of the boxes is one pound, with a standard deviation of 0.15 pounds. The mean weight of the packing material used per box is two pounds, with a standard deviation of 0.25 pounds. What is the standard deviation of the weights of the packed boxes?

- (A) 28.000 pounds
- (B) 5.290 pounds
- (C) 4.085 pounds
- (D) 2.400 pounds
- (E) 2.021 pounds

13) The probability that there will be an accident on Highway 48 each day depends on the weather. If the weather is dry that day, there is a 0.2% chance of an accident on Highway 48; if the weather is wet that day, there is a 1.0% chance of an accident. Today, the weather station announced that there is a 20% chance of the weather being wet. What is the probability that there will be an accident on Highway 48 today?

- (A) 0.0004
- (B) 0.0016
- (C) 0.0020
- (D) 0.0036
- (E) 0.0060

14) During flu season, a city medical center needs to keep a large supply of flu shots. A nurse's aid compiles data on the number of flu shots given per day in the past few years during flu season. A cumulative probability chart of the collected data is as follows:



How many flu shots should the center store every day to meet the demand on 95 percent of the days?

- (A) At most 190
- (B) At most 140
- (C) Exactly 170
- (D) At least 150
- (E) At least 200

- 15) A pharmaceutical company is interested in the association between advertising expenditures and sales for various over-the-counter products. A sales associate collects data on nine products, looking at sales (in \$1000) versus advertising expenditures (in \$1000). The results of the regression analysis are shown below.

Dependent variable: Sales

Source	df	Sum of Squares	Mean Square	F-ratio
Regression	1	9576.1	9576.1	1118.45
Residual	7	59.9	8.6	

Variable	Coefficient	SE Coef	t-ratio	P
Constant	123.800	1.798	68.84	0.000
Advertising	12.633	0.378	33.44	0.000

R-Sq = 99.4% R-Sq (adj) = 99.3%
s = 2.926 with 9-2 = 7 degrees of freedom

- a) What is the LSRL?
- b) What is the percent of variation in Sales that can be explained by Advertising Expenditures?
- c) What is the correlation coefficient?
- d) Contextually, Explain the slope of the LSRL.