King Fahd University of Petroleum and Minerals
Department of Mathematics

CODE 000

STAT 211 BUSINESS STATISTICS I
Semester 223, Second Exam
July 30, 2023

CODE 000

Time allowed 100 minutes.

Name:_____ ID:_____

Check that this exam has 20 questions.

Important Instructions:

1. All types of smart watches or mobile phones are NOT allowed during the examination.
2. Use HB 2.5 pencils only.
3. Use a good eraser. DO NOT use the erasers attached to the pencil.
4. Write your name, ID number and on the examination paper and in the upper left corner of the answer sheet.
5. When bubbling your ID number and Section number, be sure that the bubbles match with the numbers that you write.
6. The Test Code Number is already bubbled in your answer sheet. Make sure that it is the same as that printed on your question paper.
7. When bubbling, make sure that the bubbled space is fully covered.

When erasing a bubble, make sure that you do not leave any trace of penciling.

Suppose that the probability that the new car needs a warranty repair is 0.04, the probability that the car is manufactured by a U.S.-based company is 0.6, and the probability that the new car needs a warranty repair and was manufactured by a U.S. based company is 0.025.

Based on the given information, solve the next 4 questions

1. The probability that a car, chosen at random, needs warranty or manufactured by a U.S. based company?

   A. 0.615
   B. 0.64
   C. 0.56
   D. 0.665
   E. 0.975

2. What is the probability that a car, chosen at random, needs warranty but not manufactured by a U.S. based company?

   A. 0.015
   B. 0.575
   C. 0.56
   D. 0.025
   E. 0.04

3. Suppose you know that a company based in the United States manufactured a particular car, what is the probability that the car needs warranty repair?

   A. 0.042
   B. 0.975
   C. 0.025
   D. 0.4
   E. 0.625

4. Let the two events ***A***: the car needs warranty repair, ***B***: the car manufactured by a U.S. based company. Which of the following is **not true**?

   A. A and B are mutually exclusive
   B. A and B are not mutually exclusive
   C. A and B are not independent
   D. A and B are related
   E. We cannot tell

A box of nine gloves contains two left-handed gloves and seven right-handed gloves.

Based on the given information, solve the next 3 questions

5. two gloves are randomly selected from the box, without replacement (the first glove is not returned to the box after it is selected), what is the probability that both gloves selected will be right-handed?

   A. 0.583
   B. 0.519
   C. 0.049
   D. 0.604
   E. 0.025

6. two gloves are randomly selected from the box, without replacement (the first glove is not returned to the box after it is selected), what is the probability that the second gloves will be right-handed?

   A. 0.778
   B. 0.691
   C. 0.654
   D. 0.736
   E. 0.680

7. three gloves are selected, with replacement (the gloves are returned to the box after they are selected), what is the probability that all three will be left-handed?

   A. 0.011
   B. 0
   C. 0.028
   D. 0.025
   E. 1

It is known that the probability of a tagged order form is 10%.

Based on the given information, solve the next 3 questions

8. If you keep selecting order forms until the first tagged order form, what is the probability that the first tagged order form is the 6th one.

   A. 0.059
   B. 0.295
   C. 0.328
   D. 0.066
   E. 0.590

9. In a sample of size 10 order forms, what is the probability that only the first two order forms are tagged order forms?

   A. 0.0043
   B. 0.1937
   C. 0
   D. 1
   E. 0.5

10. In a sample of size 10 order forms, what is the probability that at least two tagged order forms?

    A. 0.2639
    B. 0.6126
    C. 0.3874
    D. 0.7361
    E. 0.9613

11. The number of flaws in bolts of cloth in textile manufacturing is assumed to be Poisson distributed with a mean of 0.2 flaw per square meter. What is the probability that there are at least two flaws in 10 square meters of cloth?

A. 0.5939
B. 0.0175
C. 0.8646
D. 0.7293
E. 0.2906

12. A certain type of component is packed in lots of four. Let X represents the number of properly functioning components in a randomly chosen lot. Assume that the probability that exactly x components function is proportional x; in other words, assume that the probability mass function of X is given by

x	1	2	3	4
P(X=x)	a	2a	3a	4a

The expected value of the number of properly functioning components

A. 3
B. 2
C. 4
D. 5
E. 1

13. A manufacturer makes two models of an item:
Model I, which accounts for 80% of the unit sales.
Model II, which accounts for 20% of the unit sales.
Because of defects, manufacturer has to replace (or exchange) 10% of its model I and 18% of its model II.

Given that the selected unit is defective, what is the probability that the unit from model I?

A. 0.689
B. 0.116
C. 0.080
D. 0.036
E. 0.310

The average life of a certain type of compressor is 10 years with standard deviation of 1 year. The manufacturer replaces free all compressors that fail while under guarantee. Assume the lives of the compressors follow a Normal distribution.

Based on the given information, solve the next 2 questions

14. If a compressor selected randomly, find the probability that it has survived more than 11 years.

A. 0.1587
B. 0.8413
C. 0
D. 1
E. 0.5

15. If they are willing to replace only 3% of all the compressors sold, how long a guarantee should they offer?

A. 8.12 years
B. 11.88 years
C. 1.88 years
D. 10 years
E. 11 years

The time required to repair a machine is an exponential random variable with mean 2 hours.

Based on the given information, solve the next 2 questions

16. What is the probability that a repair time exceeds 2 hours?

A. 0.3679
B. 0.6321
C. 0.3934
D. 0
E. 0.6065

17. What is the probability that the repair time will take at least 4 hours given that the repair man has been working on the machine for 3 hours?

A. 0.6065
B. 0.6321
C. 0.3679
D. 0
E. 0.3934

18. Let X be a random variable with a continuous uniform distribution on the interval $(1, a)$ where $a > 1$. If $E(X) = 6 * Var(X)$, then $a =$

A. 3
B. 2
C. 7
D. 8
E. $3\sqrt{2}$

A rental car facility has 10 SUV's and 15 sport cars waiting to be served on a particular Saturday morning. Because there are so few mechanics working on Saturday, only 6 cars can be serviced. If the 6 cars are chosen at random

Based on the given information, solve the next 2 questions

19. What is the probability that 3 of cars selected are SUV's and the other are sport cars?

A. 0.3083
B. 0.6917
C. 0.0225
D. 09775
E. 0.5

20. What is the probability that at most one of the selected cars are sport cars?

A. 0.0225
B. 0.3083
C. 0.6917
D. 09775
E. 0.5