Elementary Statistics
Test 2
Spring 2004

Name:……..
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1 Let $S=\{1,2,3,4,5,6\}$, $A=\{3,4,6\}$, and $B=\{2,4\}$. Draw a Venn diagram and find the following sets (events).

(a) $A\cap B$.

(b) $A\cap B'$.

(c) $A'\cap B'$.

(d) $A\cup B'$.

2 What are the four rules of probability?

(a)

(b)

(c)

(d)

3 What are the odds for the occurrence of an event if its probability is 0.75?

4 Convert the 4 to 5 odds into a probability.

5 Given $P(A) = 0.59$, $P(B) = 0.46$, and $P(A \cap B) = 0.38$, draw a Venn diagram, fill in the probabilities associated with the various regions, and thus determine

(a) $P(A' \cap B)$;

(b) $P(A \cup B)$;

(c) $P(A' \cap B')$;

(d) $P(A' \cup B)$.

6 In the following table, 60 college students are classified according to their class standing and also according to their favorite pizza topping:

	A Anchovies	O Onions	M Mushrooms	H Hamburger
Freshman (F)	7	6	7	3
Sophomore (S)	1	9	0	9
Junior (J)	3	2	5	8

If one student is selected at random, find

(a) $P(F \cap A)$;

(b) $P(F \cup A)$;

(c) $P(F \mid A)$.

7 In a third world country 40% of the population has their own transportation. If a sample of 10 people form this population is selected at random, find the probability that

(a) more than 6 people in the sample have their own transportation;

(b) at most 2 people in the sample have their own transportation;

(c) at least 6 people in the sample have their own transportation.

8 Let the random variable X have a binomial distribution with $n = 10$ and $p = 0.4$. Find

(a) the mean of the distribution;

(b) the variance of the distribution.

9 (a) Find $Z_{0.005}$. **Draw a graph with all the details.**

Answer: $Z_{0.005}$ =_____

(a) Find $Z_{0.01}$. **Draw a graph with all the details.**

Answer: $Z_{0.01}$ =_____

10 Find the mean, variance and the standard deviation of the following distribution.

x	0	1	2	3
$f(x)$	0.274	0.491	0.196	0.039

Answers:

Mean:_____

Variance:_____

S.D.:_____

11 Let Z have a standard normal distribution. Find the following:

Draw graphs with all the details.

(a) $P(-1.35 < Z < 2.58)$;

(b) $P(1.35 < Z < 2.58)$.

12 The weights of a large shipment of cast iron bollards are random variables with mean 50.25 pounds and standard deviation 0.63 pounds. What is the probability that a randomly selected bollard from this shipment will weigh

(a) less than 49 pounds;

(b) between 50 to 51 pounds?

13 Sample space is all the possible outcomes of an experiment. (T, F).

14 For any two events A and B, $P(A \cup B) = P(A) + P(B)$. (T, F)

15 μ is the symbol for sample mean. (T, F)

16 Normal curves are symmetric about the mean. (T, F)

17 If A and B are mutually exclusive sets (events), then $A \cap B$ is an empty set (event). (T, F)

18 Area under the standard normal curve is one unit. (T, F)

19 Area under the curve of a normal distribution with mean 10 and standard deviation 2 is equal to one (T,F).