

Exam 2 CANARY

A. Miller

Fall 98

Math 210

Show all work.

Explain your answers.

You may use a “dumb” calculator,
but one is not necessary.

Name _____

Circle the time of your TA section:

Tues 8:50

Tues 9:55

Thurs 8:50

Thurs 9:55

Problem	Points	Score
1	18 %	
2	15 %	
3	17 %	
4	16 %	
5	18 %	
6	16 %	
Total	100%	

1. (16 %) A sound system is such that when it is used,
- the microphone malfunctions with probability .15,
 - the speakers malfunction with probability .05, and
 - both malfunction with probability .02.

What is the probability that either the microphone malfunctions or the speakers malfunction but not both?

2. (16 %) The events X and Y satisfy $Pr(X) = .6$ and $Pr(X \cup Y) = .8$ what is $Pr(Y)$ in the following cases:

(a) X and Y are disjoint.

(b) X is a subset of Y .

(c) X and Y are independent.

3. (16 %) At the University of Wisconsin, 15% of the students have taken calculus in high school. Of those who have taken calculus in high school 50% plan to major in science. Of those who have not taken calculus in high school 5% plan to major in science. What is the probability that a randomly chosen student is planning to major in science?

4. (18 %) A used car lot contains

10% Chevrolets,
60% Dodges, and
30% Fords.

Half of the Chevrolets, a fourth of the Dodges, and a tenth of the Fords are vans. A random automobile is chosen.

(a) What is the probability that it is a van?

(b) If it happens to be a van, what is the probability that it is a Ford?

(c) If you buy this car and as you drive out of the lot it falls into two pieces, which piece do you own?

6. (18 %) A kindergarten teacher has 10 boys and 11 girls. He picks three of them at random (without replacement). A random variable X is defined to be the number of girls selected.

(a) What are the possible values that X can have?

(b) What is the probability that $X = 3$?

(c) Find the probability density function of X .

(d) Find the expected value of X .

Answers

1. .16
2. (a) .2 (b) .8 (c) .5
3. .1175
4. (a) .23 (b) .13043478
(c) I was with a friend who was buying a used car. He found one he liked for a thousand dollars and as he was negotiating with the salesman over price he asked if there was a guarantee or warranty. The salesman said, "My friend, if you buy this car and on the way out of the lot it falls into two pieces, then I guarantee that you will own **both pieces**."
5. (a) .288 (b) .9811584
6. (a) $\{0, 1, 2, 3\}$ (b) $p_3 = 165/1330$ (c) $p_0 = 120/1330$, $p_1 = 495/1330$, $p_2 = 550/1330$ (d) $2090/1330$