

Exam 2 PINK

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	16 %	
2	16 %	
3	16 %	
4	18 %	
5	16 %	
6	18 %	
Total	100%	

1. (16 %) A sound system is such that when it is used,
- the microphone malfunctions with probability .35,
  - the speakers malfunction with probability .15, 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  $Pr(X) = .4$  and  $Pr(X \cup Y) = .7$  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 Michigan, 25% of the students have taken calculus in high school. Of those who have taken calculus in high school 55% plan to major in science. Of those who have not taken calculus in high school 10% 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

20% Chevrolets,

35% Dodges, and

45% 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?

5. (16 %) A basketball player has probability .8 of making a free throw.
- (a) If she attempts 5 free throws, what is the probability she will make exactly 1 of them?
- (b) If she attempts 6 free throws, what is the probability she will make at least 2 of them?

6. (18 %) A kindergarten teacher has 12 boys and 7 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. .46
2. (a) .3 (b) .7 (c) .5
3. .2125
4. (a) .2325 (b) .19354839  
(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) .0064 (b) .9984
6. (a)  $\{0, 1, 2, 3\}$  (b)  $p_3 = 35/969$  (c)  $p_0 = 220/969$ ,  $p_1 = 462/969$ ,  $p_2 = 252/969$  (d)  $1071/969$