PRACTICE V

Probability

1. The probability distribution function for the number of days per week that college students get a good night's sleep is as follows:

Number of Days	0	1	2	3	4
Relative Frequency	0.12	0.41	0.25	0.15	0.07

   (a) Calculate and give a brief description of the mean of this probability distribution.

   (b) In a random sample of 10 college students, there are a total of 20 good nights of sleep. A new random sample of 50 students is planned. How do you expect the average number of good nights sleep for this new sample to compare to that of the first sample? Explain.

(c) Find the median of the above distribution, where the median M is defined to be a value such that $P(x \geq M) \geq 0.5$ and $P(x \leq M) \geq 0.5$

2. A school myst choose between two snow removal services. Service A charges \$2500 yearly plus \$2000 for every month with over three snowfalls necessitating their services. Service B charges \$450 per snow removal. Relevant probabilities are shown in the following tables: Which service

Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr
$P(>3$ snowfall services)	0.01	0.02	0.18	0.28	0.22	0.13	0.02

Annual Number of Snow services	6	7	8	9	10	11	12
Probability	0.05	0.10	0.20	0.25	0.20	0.15	0.05

should the school use to minimize expected costs? Justify your answer.

3. Suppose a pregnancy test correctly tests positive for 98 percent of pregnant woman but also gives a false positive reading for 3 percent of the women who are not pregnant. Suppose 5 percent of woman who purchase this over-the-counter test are actually pregnant.

   (a) What is the probability a women tests positive?

   (b) If a woman tests positive, what is the probability she is pregnant?

   (c) If two women purchase the test and both test positive, what is the probability that exactly one of the two is pregnant?