Discrete Distributions Practice Problems

1. Utilizing the data below concerning ratings of a new intake system at a local hospital's emergency room, calculate the mean and standard deviation of the system's ratings.

X, Rating	P(X)
1	0.07
2	0.07
3	0.22
4	0.21
5	0.43

2. The following table summarizes investment outcomes and corresponding probabilities for a particular oil well: (calculate the mean and standard deviation of the profits)

X, Outcome in $	P(X)
-40,000 (no oil)	0.25
10,000 (some oil)	0.70
70,000 (much oil)	0.05

3. An insurance company sells a $20,000 whole life insurance policy for an annual premium of $300. Actuarial tables show that a person who would be sold such a policy with this premium has a 0.001 probability of death during a year. Let X be a random variable representing the insurance company's profit made on one of these policies during a year. Find the expected profit and standard deviation for the insurance company. The probability distribution of X is:

X, Profit	P(X)
$300 (if policyholder lives)	0.999
$300-$20,000 = -$19,700 (if policyholder dies)	0.001

4. The Bay Street Inn is a seven-room bed-and-breakfast in the California city of Santa Theresa. Demand for rooms generally is strong during February, a prime month for tourists. However, experience shows that demand is quite variable. The probability distribution of room rentals during February (from historical data) is shown below, where X = number of rooms rented.

X, Rooms Rented	P(X)
0	0.05
1	0.05
2	0.06
3	0.10

4	0.13
5	0.20
6	0.15
7	0.26

a) What is the mean, or expected value of the number of rooms rented?
b) What is the standard deviation of the rooms rented?
c) What is the probability that fewer than 4 rooms are rented?