Names:

## CMPSCI 240

## Reasoning Under Uncertainty Discussion 4

The first thing Oscar does every morning is to go to the supply room and pick up one, two, or three pens with equal probability 1/3. If he picks up three pens, he does not return to the supply room again that day. If he picks up one or two pens, he will make one additional trip to the supply room, where he again will pick up one, two, or three pens with equal probability 1/3. (The number of pens taken in one trip will not affect the number of pens taken in any other trip.)

1.	Let $N$ be a random variable representing the total number of pens Oscar collects on any given day. Calculate $\mathbb{E}[N C]$ , the conditional expectation of $N$ given the event $C=\{N>3\}$ .

2. Calculate the conditional standard deviation  $\sigma_{N|C}$  where N and C are defined as in part 1.

3.	Calculate the probability that he gets $> 3$ pens on each of the next 16 days. Hint: Let $C_i$ be the event that he gets $> 3$ pens on the $i$ <sup>th</sup> day, and think about independence.
	the event that he gets > 5 pens on the t day, and think about independence.
4.	Calculate the conditional standard deviation of the total number of pens he gets in the next 16 days given that he gets $> 3$ pens on each of those days. Hint: Use something from part 2.