MAT 488 Report #5 Due May 6

The Problem:
Acme Tractors produces high end tractors. They can stock up to 5 tractors per week. At the end of the week (Friday) their policy is to order 5 new tractors if they have no tractors left. Even if they have 1 tractor left on Friday, they will not order new tractors for Monday of the next week. You can assume that the weekly demand for their tractors follows a Poisson Distribution with mean 1.

1. Explain how Markov Chains can be used in this situation and give the transition matrix
2. Assuming they have 5 tractors to start on Monday of week 1, what the probability distribution for their number of tractors in stock at the start of week 2? Week 3? Week 10?
3. Find the steady state probability vector. Interpret this vector.
4. Find the steady state probability that demand in a given week exceeds supply.
5. Perform a sensitivity analysis on mean demand. Do this by finding the steady state probability that demand is greater than supply assuming that the weekly mean is 0.50, 0.75, 1.25, 1.50. (4 values)
6. Conclude your report with any generalizations, recommendations or observations.

The report should be between 3 and 6 pages long. (double spaced).
Make sure to proofread the report.
The report will be graded out of 50 points:
20 points for accuracy of the calculations.
20 points for correct interpretations and explanations.
10 points for style (lack of errors, proper English, etc.)
Be sure to round consistently and to a reasonable precision.

Reports must be typed and explanations written in proper English.
Graphs and tables must be computer generated and labeled clearly.
Answers to questions must be included in the body of the report not just highlighted or referenced to computer output.
The report must be one file, but you may submit other files that show complex calculations (Spreadsheets, CAS work sheets, software programs) as additional files.
You do not need to derive formulas or theorems but you should briefly explain your methodology.

Submit via BB9. The file must be a docx or pdf. Name the file <your last name>P5.docx or .pdf

Late submissions will be SEVERELY penalized!