MTH 210 EXAM - PART 2

1. Suppose $A = \begin{pmatrix} .3 & .8 \\ .7 & .2 \end{pmatrix}$ and $X = \begin{pmatrix} 1500 \\ 0 \end{pmatrix}$ and $Y = \begin{pmatrix} 0 \\ 1500 \end{pmatrix}$. We wish to evaluate $A^n X$ and $A^n Y$ when n is large- in other words we want the limit as n tends to infinity in each case. Find the limits. You must justify your work, that is, "prove" that your answers are correct.

2. On the exam there was a problem involving five linear equations with only three variables. Here is another example. You must determine what relations must exist among the a, b, c, d and e for the system to have a solution, and how many solutions there are if there are any. You must explain your answers. Here is the system

$$x + 2y + 3z = a$$

$$4x + 5y + 6z = b$$

$$7x + 8y + 10z = c$$

$$12x + 15y + 19z = d$$

$$30x + 36y + 45z = e$$