Math 54 Green Questions

Chapter 1.1

Q 23
(a) T (b) F (a) T (b) T

Q 24
(a) T (b) F (c) F (d) T

Chapter 1.2

Q 21
(a) F (b) F (c) T (d) T (e) F

Q 22
(a) F (b) F (c) T (d) T (e) T

Q 23
The system is consistent because it would be impossible to have a row in the augmented matrix of the form $\begin{bmatrix}0 & 0 & 0 & 0 & 0 & 1\end{bmatrix}$ (corresponding to an equation of the form $0 = 1$).

Q 24
Inconsistent. This is exactly the situation described in the previous question.

Chapter 1.5

Q 29 (a) No. The REF form of the augmented matrix is $\begin{bmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\end{bmatrix}$ with unique solution $x = y = z = 0$.

(b) Yes because the augmented matrix for this case will be $\begin{bmatrix}1 & 0 & 0 & *\\ 0 & 1 & 0 & *\\ 0 & 0 & 1 & *\end{bmatrix}$.
(note before applying row reduction the far right column will be equal to the

vertical vector **b** however after applying row reduction to get the coefficient matrix into this form the far right column will contain some jumbled up version of the values of **b**.)

Q 30 (a) Yes. A 3×3 matrix with only 2 pivots must have 1 free variable (why?) and the bottom row must be all zeros (try putting a 1 there and writing it in REF form with only 2 pivots).
(b) No, because the last row of the coefficient matrix is all zeros, a 1 at the bottom of the far right column of the augmented matrix would make things inconsistent.

Q 31 (a) The REF of this matrix has to look like: $\begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 0 \end{bmatrix}$, Thus the only solution is $x = y = 0$.
(b) No, again it is easy to use the last row to make the system inconsistent.

Q 32 (a) Yes, because with only 2 pivots and 4 variables the system must have 2 free parameters.
(b) Yes, because the coefficient matrix cannot possibly have a row of zeros with which to construct a inconsistent row.