1. Unnecessary notation is distracting. A common example of this is introducing variables such as A and $\vec{b}$ or $\vec{x}$ to label matrices and vectors when it is not needed.

2. If you are attempting to prove the equivalence of two expressions, do not start with the equality that you are trying to prove. Instead, begin with one side and write a chain of equalities that ends with the other side.

3. Write complete sentences. Everything you write should be able to be read from top to bottom. Equations are sentences too, so make sure to use punctuation properly! Don't use symbols like $\therefore$ or $\to$ (which is not the same as $\implies$, and should not be used to direct a reader's attention) in a sentence mostly words.

4. Do not turn in rough drafts! Check your work and write your solutions neatly and clearly before turning them in. Make sure that every word or symbol you put on the paper is necessary. Do NOT include work that you did to think through the problem unless it is necessary to the solution.

5. If it is possible to prove or explain something without using a contradiction technique, it is better to avoid doing so. That being said, if you are trying to *disprove* something, it is usually simplest to provide a counterexample.

6. Quantify variables that you are using for your proofs in the proper place. For example, "for all $b \in \mathbb{R},\ 0 \neq b$" is not equivalent to "$0 \neq b$ for all $b \in \mathbb{R}$."

7. If a system has a free variable, this does not imply that the system has infinitely many solutions.

8. *Matrices* don't have solutions: *systems* do.

9. Do not confuse sets and matrices:
$$\begin{bmatrix} a & b & c \end{bmatrix} \neq \{a, b, c\}.$$

10. When writing the components of a *vector*, they themselves are not also vectors, they are scalars, so do not have vector arrows above them. For example,
$$\begin{bmatrix} \vec{a} & \vec{b} & \vec{c} \end{bmatrix}$$
is a matrix whose columns are the vectors $\vec{a}$, $\vec{b}$, and $\vec{c}$, while
$$\begin{bmatrix} a & b & c \end{bmatrix}$$
is a matrix whose three entries are scalars. Write $\vec{a}$ for a vector (include the arrow).

11. Doing row reductions horizontally is better organizationally, and remember to put the row operations above the similar symbol between matrices like this: $\overset{R_1 \to R_1 + R_2}{\sim}$.

12. When writing down an arbitrary matrix, do not change the letter of the entries. Instead, use two subscripts. For example, write,
$$\begin{bmatrix} \vec{a}_1 & \vec{a}_2 & \dots & \vec{a}_n \end{bmatrix} = \begin{bmatrix} a_{1,1} & a_{2,1} & \dots & a_{n,1} \\ a_{1,2} & a_{2,2} & \dots & a_{n,2} \\ \vdots & \vdots & & \vdots \\ a_{1,m} & a_{2,m} & \dots & a_{n,m} \end{bmatrix}.$$

13. Cite theorems with proper references to chapters. For example, everyone's favorite, Theorem 4 from Chapter 1 can be written Theorem 1.4.

14. Do not start talking about a matrix for a transformation before you have noted that one even exists. Also not confuse the matrix for a transformation with the function iteslf. For example, do not say "the transformation T has n pivots" or "A maps from $\mathbb{R}^m$ to $\mathbb{R}^n$."

15. Sets of vectors or columns (or rows) of a matrix can be linearly (in)dependent, not matrices themselves.

16. Do not use the word 'it' unless you are 100% sure that it is clear what *it* is referring to. It is best practice to eliminate 'it' (and other words like 'it') from your proofs.

17. $\mathbb{R}^n = \{(x_1, x_2, \ldots, x_n) \,:\, x_1, x_2, \ldots, x_n \in \mathbb{R}\}$ is the set of all ordered tuples of n real numbers, not R^n.

18. The word multiplied can take on many different meanings, so be clear in what sense you are using it. For example, to say that you "multiply a row of A and a column of B" is vague.

19. If transformation T is linear, then $T(\vec{0}) = \vec{0}$. The converse of this statement, if $T(\vec{0}) = \vec{0}$, then T is linear, is false. That is, it is not true for all transformations T that $T(\vec{0}) = \vec{0}$ implies that T is linear. There are plenty of non-linear transformations that send 0 to 0.

20. Don't do this: "Write $I_n = \begin{bmatrix} I_1 & I_2 & \ldots & I_n \end{bmatrix}$." This would imply that I_n is somehow recursively defined. You mean to write

$$I_n = \begin{bmatrix} e_1 & e_2 & \ldots & e_n \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & \ldots & 0 \\ 0 & 1 & 0 & \ldots & 0 \\ 0 & 0 & 1 & & 0 \\ \vdots & \vdots & & \ddots & \vdots \\ 0 & 0 & 0 & \ldots & 1 \end{bmatrix}.$$

21. Never draw ... where it is unclear what it means. For example, you can write $(1, 0, \ldots, 0)$ for $(1, 0, 0, 0, 0, 0, 0, 0, 0)$, but not $(1, 0, 1, \ldots, 0)$ for $(1, 0, 1, 0, 0, 0, 0, 0, 0)$. Usually dots can be drawn when there is some arithmetic progression that is very obvious like $(1, 2, 3, 4, \ldots, 104)$, or between entries that are identical like $(1, 0, 1, \ldots, 0)$ for $(1, 0, 1, 0, 0, 0, 0, 0, 0)$. Always justify answers unless it is specifically stated not to do so.