Handwritten HW 7

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32. Describe the possible echelon forms of the matrix. Use the notation of Example 1 in Section 1.2.
A is a 4×3 matrix, $A = \begin{bmatrix} \mathbf{a}_1 & \mathbf{a}_2 & \mathbf{a}_3 \end{bmatrix}$, such that $\{\mathbf{a}_1, \mathbf{a}_2\}$ is linearly independent and $\mathbf{a}_3$ is not in $\text{Span}\{\mathbf{a}_1, \mathbf{a}_2\}$.

Solution:

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34. How many pivot columns must a 5×7 matrix have if its columns span $\mathbb{R}^5$? Why?

Solution:

38. This exercise should be solved *without performing row operations.* [*Hint:* Write $A\mathbf{x} = \mathbf{0}$ as a vector equation.]
Given $A = \begin{bmatrix} 4 & 1 & 6 \\ -7 & 5 & 3 \\ 9 & -3 & 3 \end{bmatrix}$, observe that the first column plus twice the second column equals the third columns. Find a nontrivial solution of $A\mathbf{x} = \mathbf{0}$.

Solution: