1. Let $A = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$. Write **true** or **false** for each of the following statements about A.

   Hint: You may not need to work super-hard for most of these!

   (a) $A\mathbf{x} = \mathbf{0}$ has non-trivial solutions.

   (b) The RREF of A is equal to the 3×3 identity matrix I_3.

   (c) The columns of A form a linearly dependent set.

   (d) The transformation $\mathbf{x} \mapsto A\mathbf{x}$ is one-to-one.

   (e) The transformation $\mathbf{x} \mapsto A\mathbf{x}$ is onto.

   (f) The columns of A span $\mathbb{R}^3$.

   (g) The range of the transformation $\mathbf{x} \mapsto A\mathbf{x}$ equals its codomain.

   (h) The matrix A^{-1} exists.

   (i) $\det(A) = 7$.

   (j) There exists some $\mathbf{b} \in \mathbb{R}^3$ for which $A\mathbf{x} = \mathbf{b}$ <u>doesn't</u> have a solution.

   (k) A^T is invertible.