Using Images and Kernels

$f : R^n \rightarrow R^m$ is a linear mapping $\Leftrightarrow$ $\exists$ an $m \times n$ matrix A such that $f(x) = Ax$

Can write $Im(f)$ **as** $Im(A)$ **and** $Ker(f)$ **as** $Ker(A)$

$Im(A) = Im(f)$ **= span of linearly independent columns of A**
$Ker(A)$ **= solutions of** $Ax = 0$
$\dim(Im(A)) + \dim(Ker(A)) = n$