Application Activities - Module S Part 2 - Class Day 13

Activity 13.1 (take basis shown to be linearly independent in previous day, and show that it spans)

Definition 13.2 A **basis** is a linearly independent set that spans a vector space.

Observation 13.3 A basis may be thought of as building blocks for a vector space, since every vector in the space can be expressed as a unique linear combination of basis vectors.

Activity 13.4 (given four sets of general vectors, identify which are bases and which aren't)

Activity 13.5 If $\{\mathbf{v}_1, \mathbf{v}_2, \mathbf{v}_3, \mathbf{v}_4\}$ is a basis for $\mathbb{R}^4$, that means RREF$[\mathbf{v}_1\,\mathbf{v}_2\,\mathbf{v}_3\,\mathbf{v}_4]$ doesn't have a column without a pivot position, and doesn't have a row of zeros. What is RREF$[\mathbf{v}_1\,\mathbf{v}_2\,\mathbf{v}_3\,\mathbf{v}_4]$?

Fact 13.6 The set $\{\mathbf{v}_1, \dots, \mathbf{v}_m\}$ is a basis for $\mathbb{R}^n$ if and only if $m = n$ and RREF$[\mathbf{v}_1\ \dots\ \mathbf{v}_n] = \begin{bmatrix} 1 & 0 & \dots & 0 \\ 0 & 1 & \dots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \dots & 1 \end{bmatrix}$

Activity 13.7 (given four sets of IR^5 vectors, identify which are bases and which aren't)

Activity 13.8 How can {u,v,u+v} (but with numbers) be changed to make it linearly independent?
