Math 3330. End of Sec 3.2 2/26/15

Recall from class today that $\{v_1, \ldots, v_m\}$ is an (ordered) basis of a subspace W if

- $W = \mathbb{R}v_1 + \cdots + \mathbb{R}v_m$ and
- $v_1, \ldots, v_m$ are linearly independent.

E.g. $\{e_1, \ldots, e_n\}$ is a basis of $\mathbb{R}^n$.

Why?
- $\mathbb{R}^n = \mathbb{R}e_1 + \mathbb{R}e_2 + \cdots + \mathbb{R}e_n$ and
- we showed in class that $e_1, \ldots, e_n$ are lin indep.

Thm L21 Every subspace W of $\mathbb{R}^n$ has a basis.

Remark Every subspace has many bases.....

E.g. $W = \mathbb{R}^2$ $\{e_1, e_2\}$ or $\{-e_1, e_2\}$, or $\{e_1, -e_2\}$, or $\{-e_1, -e_2\}$ or $\{e_1, e_1+e_2\}$, etc.