Cards for 2.3 Activity:

Making Connections: You will be given a stack of index cards that identify certain properties. Determine under which of the following headings each card belongs. Note that each card will fit under one of #1-3 and one of #4-6.

Throughout this activity, let $A = \begin{bmatrix} | & & | \\ v_1 & \cdots & v_k \\ | & & | \end{bmatrix}$ where each $\mathbf{v}_i$ is a vector in $\mathbb{R}^n$.

1. The vectors $\mathbf{v}_1, \mathbf{v}_2, \ldots \mathbf{v}_k$ span $\mathbb{R}^n$.
2. The vectors $\mathbf{v}_1, \mathbf{v}_2, \ldots \mathbf{v}_k$ do not span $\mathbb{R}^n$.
3. We need more information to determine whether the vectors $\mathbf{v}_1, \mathbf{v}_2, \ldots \mathbf{v}_k$ span $\mathbb{R}^n$.
4. The vectors $\mathbf{v}_1, \mathbf{v}_2, \ldots \mathbf{v}_k$ are linearly dependent.
5. The vectors $\mathbf{v}_1, \mathbf{v}_2, \ldots \mathbf{v}_k$ are linearly independent.
6. We need more information to determine whether the vectors $\mathbf{v}_1, \mathbf{v}_2, \ldots \mathbf{v}_k$ are linearly dependent.

The linear system corresponding to [**A**|**0**] has exactly one solution.

One of the vectors can be expressed as a linear combination of the others.

One vector is a scalar multiple of one of the others.

The row reduced form of the augmented matrix *A* has no all zero rows.

$c_1\mathbf{v}_1 + c_2\mathbf{v}_2 \cdots + c_k\mathbf{v}_k = 0$ only if $c_i = 0$ for all *i*.

The linear system corresponding to [**A**|**0**] has at least two solutions.

$\text{Rank}(A) < n$

$k = n$

The row reduced form of the augmented matrix *A* has a leading entry in every column.

$n < k$

$\text{Rank}(A) = n$

$k < n$