MATH 54 Spring 2016
Section 1 Name: ______________________________

Linear algebra originated from solving linear systems, through row reductions. There are three basic row reduction operations:

- Linear combination of two rows;
- Scalar multiple of a row;
- Interchange two rows.

Also, make sure that you are clear about the two conceps:
Echolon form and Reduced Echolon form

1. Try to explain to your group mates what is the span of n vectors.

2. What conditions on a, b, c, d will guarantee that the following system has exactly one solution?

$$\begin{aligned} ax + by = & \; 1 \\ cx + dy = & \; 0 \end{aligned}$$

3. For which λ does the following system have more than one solutions:

$$\begin{aligned} (\lambda - 3)x + y = & \; 0 \\ x + (\lambda - 3)y = & \; 0 \end{aligned}$$

4. Let $u = [2, -1], v = [2, 1]$, show that $[h, k]$ is in the span of u, v for arbitrary h and k.

5. Solve $Ax = b$:

$$A = \begin{bmatrix} 2 & 0 & 6 \\ -1 & 8 & 6 \\ 1 & -2 & 1 \end{bmatrix}, \quad b = \begin{bmatrix} 10 \\ 3 \\ 7 \end{bmatrix}$$

6. Solve $Ax = b$:

$$A = \begin{bmatrix} 1 & 0 & -4 \\ 0 & 3 & -2 \\ -2 & 6 & 3 \end{bmatrix}, \quad b = \begin{bmatrix} 4 \\ 1 \\ -4 \end{bmatrix}$$

7. For what value of h is y in the span of $v1$ and $v2$:

$$v1 = \begin{bmatrix} 1 \\ 0 \\ -2 \end{bmatrix} v2 = \begin{bmatrix} -2 \\ 1 \\ 7 \end{bmatrix} y = \begin{bmatrix} h \\ -3 \\ -5 \end{bmatrix}$$