Name: _____ Sort #: _____

# Worksheet 2

**Row Echelon Form & Vector Equations** MATH 2250, Fall 2018

1. Row reduce the matrix

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 4 & 5 & 6 & 7 \\ 6 & 7 & 8 & 9 \end{bmatrix}$$

to reduced echelon form. Circle the pivot positions in the final matrix.

2. Write a vector equation that is equivalent to the system of equations.

$$\begin{array}{rcrcrcr} & & x_2 & + & 5x_3 & = & 9 \\ 4x_1 & + & 6x_2 & - & x_3 & = & 7 \\ -x_1 & + & 3x_2 & - & -8x_3 & = & -2 \end{array} \tag{1}$$

3. Write a system of equations that is equivalent to the vector equation.

$$v_1 \begin{bmatrix} 6 \\ -1 \\ 5 \end{bmatrix} + v_2 \begin{bmatrix} -3 \\ 4 \\ 0 \end{bmatrix} = \begin{bmatrix} 1 \\ -7 \\ -5 \end{bmatrix}$$

4. Determine if $\mathbf{b}$ is a linear combination of $\mathbf{v_1}, \mathbf{v_2}, \mathbf{v_3}$ where

$$\mathbf{v_1} = \begin{bmatrix} 1 \\ -2 \\ 0 \end{bmatrix}; \quad \mathbf{v_2} = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}; \quad \mathbf{v_3} = \begin{bmatrix} 5 \\ -6 \\ 8 \end{bmatrix}; \quad \mathbf{b} = \begin{bmatrix} 2 \\ -1 \\ 6 \end{bmatrix}$$

You may use your calculator or other tool to perform row reduction.