



## Math 2940 Quiz 1

### Solutions

September 12th, 2019

Section 208

Name:

NetID:

Row reduce the following matrix to *reduced* echelon form. Circle the pivot positions in the final matrix, and list the pivot columns.

$$\begin{bmatrix} 1 & 3 & 5 & 2 \\ 3 & 5 & 7 & 9 \\ 5 & 7 & 9 & 16 \end{bmatrix}$$

**Solution:** We can row reduce the matrix as follows:

$$\begin{bmatrix} 1 & 3 & 5 & 2 \\ 0 & -4 & -8 & 3 \\ 0 & -8 & -16 & 6 \end{bmatrix} \begin{array}{l} \leftarrow \text{Row 2} + (-3) \cdot \text{Row 1} \\ \leftarrow \text{Row 3} + (-5) \cdot \text{Row 1} \end{array}$$

$$\begin{bmatrix} 1 & 3 & 5 & 2 \\ 0 & -4 & -8 & 3 \\ 0 & 0 & 0 & 0 \end{bmatrix} \leftarrow \text{Row 3} + (-2) \cdot \text{Row 2}$$

$$\begin{bmatrix} 1 & 3 & 5 & 2 \\ 0 & 1 & 2 & -3/4 \\ 0 & 0 & 0 & 0 \end{bmatrix} \leftarrow \left(\frac{-1}{4}\right) \cdot \text{Row 2}$$

$$\begin{bmatrix} 1 & 0 & -1 & 17/4 \\ 0 & 1 & 2 & -3/4 \\ 0 & 0 & 0 & 0 \end{bmatrix} \leftarrow \text{Row 1} + (-3) \cdot \text{Row 2}$$

Now the matrix is in reduced echelon form. With the pivot positions circled:

$$\begin{bmatrix} \textcircled{1} & 0 & -1 & 17/4 \\ 0 & \textcircled{1} & 2 & -3/4 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

Pivot columns are 1 and 2