Name: _____ **MA162**

Section: _____

Date: 2010-02-02

Activity 2.3a: RREF

1. Bring this matrix to RREF:

$$\left[\begin{array}{ccc|c} 1 & 0 & 1 & 8 \\ 0 & 1 & 0 & 4 \\ 0 & 0 & 1 & 5 \end{array}\right] \longrightarrow \left[\begin{array}{ccc|c} & & & \\ & & & \\ & & & \end{array}\right]$$

2. Bring this matrix to RREF:

$$\left[\begin{array}{ccc|c} 7 & 0 & 0 & 21 \\ 0 & 1 & 0 & 4 \\ 0 & 0 & 1 & 5 \end{array}\right] \longrightarrow \left[\begin{array}{ccc|c} & & & \\ & & & \\ & & & \end{array}\right]$$

3. Bring this matrix to RREF:

$$\left[\begin{array}{ccc|c} 2 & 0 & 6 & 36 \\ 0 & 1 & 0 & 4 \\ 0 & 0 & 2 & 10 \end{array}\right] \longrightarrow \left[\begin{array}{ccc|c} & & & \\ & & & \\ & & & \end{array}\right]$$

$$\longrightarrow \left[\begin{array}{ccc|c} & & & \\ & & & \\ & & & \end{array}\right]$$

$$\longrightarrow \left[\begin{array}{ccc|c} & & & \\ & & & \\ & & & \end{array}\right]$$

4. Bring this matrix to RREF:

$$\left[\begin{array}{cc|c} 2 & 3 & 4 \\ 4 & 5 & 6 \end{array}\right] \longrightarrow \left[\begin{array}{cc|c} & & \\ & & \\ & & \end{array}\right]$$

$$\longrightarrow \left[\begin{array}{cc|c} & & \\ & & \\ & & \end{array}\right]$$

$$\longrightarrow \left[\begin{array}{cc|c} & & \\ & & \\ & & \end{array}\right]$$

Activity 2.3b: Degeneracy

1. Does this matrix have one, none, or infinitely many solutions:

$$\left[\begin{array}{ccc|c} 1 & 17 & 0 & 43 \\ 0 & 0 & 29 & 21 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

2. Does this matrix have one, none, or infinitely many solutions:

$$\left[\begin{array}{ccc|c} 1 & 17 & 0 & 43 \\ 0 & 0 & 29 & 21 \\ 0 & 0 & 0 & 19 \end{array}\right]$$

3. Reduce this matrix to RREF. Does it have one, none, or infinitely many solutions?

$$\left[\begin{array}{ccc|c} 1 & 17 & 0 & 43 \\ 0 & 0 & 29 & 21 \\ 0 & 0 & 58 & 42 \end{array}\right]$$

4. For every value of k, this matrix is in RREF. For what single value of k does it have infinitely many solutions?

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 43 \\ 0 & 1 & 0 & 21 \\ 0 & 0 & k & 0 \end{array}\right]$$

5. For every value of k, this matrix is in RREF. For what single value of k does it have no solutions?

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 43 \\ 0 & k & 0 & 21 \\ 0 & 0 & 1 & 19 \end{array}\right]$$

6. For every value of k, this matrix is in RREF. For what single value of k does it have infinitely many solutions?

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 43 \\ 0 & 1 & 0 & 21 \\ 0 & 0 & 0 & k \end{array}\right]$$

7. For every value of k, this matrix is in RREF. Does changing k affect how many solutions there are?

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 43 \\ 0 & 1 & 0 & 21 \\ 0 & 0 & 1 & k \end{array}\right]$$

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Quiz on 2.3: RREF and degeneracy

1. Bring this matrix to RREF:

$$\left[\begin{array}{ccc|c} 2 & 6 & 6 & 57 \\ 0 & 2 & 0 & 8 \\ 0 & 0 & 2 & 10 \end{array}\right] \longrightarrow$$

$$\longrightarrow$$

$$\longrightarrow$$

$$\longrightarrow$$

$$\longrightarrow$$

2. Read the answer from this RREF matrix:

$$\left[\begin{array}{ccc|c} 1 & 2 & 0 & 4 \\ 0 & 0 & 1 & 5 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

$(x =$ _____, $y =$ _____, $z =$ _____$)$