**PreCalculus Review 8.1/8.2 Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Determine the order of each matrix.**

 $\left[ \begin{matrix}-3&2\\11&0\\-1&8\end{matrix} \right]$ $\left[\begin{matrix}\begin{matrix} -6&2\end{matrix}&\begin{matrix}15&1 \end{matrix}\end{matrix}\right]$

**Write the augmented matrix for the system of linear equations.**

$\left\{\begin{matrix} x+3y+ z=9\\ y -2z=5\\-x+4y+2z=11\end{matrix}\right.$

**Use the elementary row operations indicated to obtain the new row-equivalent matrix.**

 $\left[ \begin{matrix}1&-3&10\\5&1&24\\3&6&-9\end{matrix} \right]$ $\left[ \begin{matrix}5&2&-6\\11&4&7\\1&8&13\end{matrix} \right]$

*R*1

 $\left[\begin{matrix}1&3&-15\\5&8&24\\&&\end{matrix}\right]$ $\left[\begin{matrix}&&\\11&4&7\\&&\end{matrix}\right]$

*R3*

*-3R1 + R3*

**Detremine whether each matrix is in row-echelon form, reduced row-echelon form or neither.**

 $\left[ \begin{matrix}\begin{matrix}1&5\end{matrix}&\begin{matrix}0&0\end{matrix}\\\begin{matrix}0&0\end{matrix}&\begin{matrix}1&0\end{matrix}\\\begin{matrix}0&0\end{matrix}&\begin{matrix}0&1\end{matrix}\end{matrix} \right]$ $\left[ \begin{matrix}1&7&-6\\0&1&4\\0&0&1\end{matrix} \right]$

a) row-echelon form a) row-echelon form

 b) reduced row-echelon form b) reduced row-echelon form

 c) neither c) neither

**Write the system of linear equations represented by the augmented matrix. Then use back substitution to solve. (Use variables *x*, *y*, and *z*)**

$\left[ \begin{matrix}\begin{matrix}1&-5&4\end{matrix}&\begin{matrix}\vdots &1\end{matrix}\\\begin{matrix}0& 1& 2\end{matrix}&\begin{matrix}\vdots &3 \end{matrix}\\\begin{matrix}0& 0& 1\end{matrix}&\begin{matrix}\vdots &4\end{matrix}\end{matrix}\right]$

**Write the matrix in row-echelon form. Show your work, including the elementary row operations used.**

$\left[ \begin{matrix}0&1&1\\1&2&3 \\2&2&2\end{matrix}\right]$

**Use matrices to solve the system of equations. Use either row-echelon with back substitution or reduced row echelon form. Show your work, including the elementary row operations used.**

$\left\{ \begin{matrix}2x-5y=2\\3x-7y=1\end{matrix}\right.$

**Use the matrix capabilities of a graphing calculator to reduce the augmented matrix corresponding to the system of equations, and solve the system.**

$\left\{ \begin{matrix}\begin{matrix}2x+ y + z = 6 \\ -2y+3z- w= 9\end{matrix}\\\begin{matrix}3x+3y-2z-2w=-11\\x + z =3 \end{matrix}\end{matrix}\right.$

**Use the equivalent matrices to find *x* and *y*.**

 $\left[ \begin{matrix}x+2&7&-2\\3&0&2y\end{matrix} \right]=\left[ \begin{matrix}8&7&-2\\3&0&14\end{matrix} \right]$

**Perform the matrix operations. If it is not possible, explain why.**

$\left[\begin{matrix} 5&-6&0\\ -1&12&4\\-8& 3&11\end{matrix} \right]+\left[ \begin{matrix}0& 3&1\\6& 9&1\\4&-2&0\end{matrix} \right]$ $\left[ \begin{matrix}0&-5&7\\3&10&2\end{matrix} \right]-\left[ \begin{matrix}5&11\\6&-1\\2& 8\end{matrix} \right]$

 $-3\left[ \begin{matrix} 9\\-13\\ 4\end{matrix} \right]$ $2\left[ \begin{matrix}8&0\\1&-2\end{matrix} \right]+4\left[ \begin{matrix}-1&3\\10&5\end{matrix} \right]$

**If possible, find the product *AB* and *BA*. Use** $A=\left[\begin{matrix} 5&4\\-7&2\\ 11&1\end{matrix} \right]$ and $B=\left[ \begin{matrix}4&12& 0\\2& 3&-1\end{matrix} \right]$

**Evaluate each expression, if possible.**

 $\left[ \begin{matrix}1&2&-1\\0&4&-2\\1&1& 3\end{matrix} \right]∙\left[\begin{matrix} 1&-1&2\end{matrix} \right]$ $-3\left[ \begin{matrix}1&-1\\4& 2\end{matrix} \right]\left(\left[ \begin{matrix}0&3\\1&2\end{matrix} \right]+\left[ \begin{matrix}1& 0\\5&-3\end{matrix} \right]\right)$

**Determine the order of each matrix.**

 $\left[ \begin{matrix}-3&2\\11&0\\-1&8\end{matrix} \right]$ $3×2$ $\left[\begin{matrix}\begin{matrix} -6&2\end{matrix}&\begin{matrix}15&1 \end{matrix}\end{matrix}\right]$ $1×4$

**Write the augmented matrix for the system of linear equations.**

$\left\{\begin{matrix} x+3y+ z=9\\ y -2z=5\\-x+4y+2z=11\end{matrix}\right.$ $\left[\begin{matrix} \begin{matrix}1& 3& 1\end{matrix}&\begin{matrix}\vdots & 9\end{matrix}\\\begin{matrix} 0& 1&-2\end{matrix}&\begin{matrix}\vdots & 5\end{matrix}\\\begin{matrix}-1& 4& 2\end{matrix}& \begin{matrix}\vdots &11\end{matrix}\end{matrix}\right]$

**Use the elementary row operations indicated to obtain the new row-equivalent matrix.**

*R*1

 $\left[\begin{matrix}1&3&-15\\5&8&24\\0&15&-39\end{matrix}\right]$ $\left[\begin{matrix}1&8&13\\11&4&7\\5&2&-6\end{matrix}\right]$

*R3*

*-3R1 + R3*

**Detremine whether each matrix is in row-echelon form, reduced row-echelon form or neither.**

 $\left[ \begin{matrix}\begin{matrix}1&5\end{matrix}&\begin{matrix}0&0\end{matrix}\\\begin{matrix}0&0\end{matrix}&\begin{matrix}1&0\end{matrix}\\\begin{matrix}0&0\end{matrix}&\begin{matrix}0&1\end{matrix}\end{matrix} \right]$ $\left[ \begin{matrix}1&7&-6\\0&1&4\\0&0&1\end{matrix} \right]$

a) row-echelon form **a) row-echelon form**

 **b) reduced row-echelon form** b) reduced row-echelon form

 c) neither c) neither

**Write the system of linear equations represented by the augmented matrix. Then use back substitution to solve. (Use variables *x*, *y*, and *z*)**

$\left[ \begin{matrix}\begin{matrix}1&-5&4\end{matrix}&\begin{matrix}\vdots &1\end{matrix}\\\begin{matrix}0& 1& 2\end{matrix}&\begin{matrix}\vdots &3 \end{matrix}\\\begin{matrix}0& 0& 1\end{matrix}&\begin{matrix}\vdots &4\end{matrix}\end{matrix}\right]$ $\left(x, y, z\right)\rightarrow \left(-40, -5, 4\right)$

**Write the matrix in row-echelon form. Show your work, including the elementary row operations used.**

$\left[ \begin{matrix}0&1&1\\1&2&3 \\2&2&2\end{matrix}\right]$

$\begin{matrix}R\_{1}\\R\_{2}\\\end{matrix}$$\left[ \begin{matrix}1&2&3\\0&1&1 \\2&2&2\end{matrix}\right]$

$\begin{matrix}\\\\-2R\_{1}+R\_{3}\end{matrix}$$\left[ \begin{matrix}1& 2& 3\\0& 1& 1 \\0&-2&-4\end{matrix}\right]$

$\begin{matrix}\\\\2R\_{2}+R\_{3}\end{matrix}$$\left[ \begin{matrix}1&2& 3\\0&1& 1 \\0&0&-2\end{matrix}\right]$

$\begin{matrix}\\\\-\frac{1}{2}R\_{3}\end{matrix}$$\left[ \begin{matrix}1&2&3\\0&1&1 \\0&0&1\end{matrix}\right]$

**Use matrices to solve the system of equations. Use either row-echelon with back substitution or reduced row echelon form. Show your work, including the elementary row operations used.**

$\left\{ \begin{matrix}2x-5y=2\\3x-7y=1\end{matrix}\right.$

 $\left(x, y\right)\rightarrow \left(-9, -4\right)$

**Use the matrix capabilities of a graphing calculator to reduce the augmented matrix corresponding to the system of equations, and solve the system.**

$\left\{ \begin{matrix}\begin{matrix}2x+ y + z = 6 \\ -2y+3z- w= 9\end{matrix}\\\begin{matrix}3x+3y-2z-2w=-11\\x + z =3 \end{matrix}\end{matrix}\right.$

$\left(x, y, z, w\right)\rightarrow \left(-6.5, 9.5, 9.5, 0.5\right)$

**Use the equivalent matrices to find *x* and *y*.**

 $\left[ \begin{matrix}x+2&7&-2\\3&0&2y\end{matrix} \right]=\left[ \begin{matrix}8&7&-2\\3&0&14\end{matrix} \right]$

$x=6$ **and** $y=7$

**Perform the matrix operations. If it is not possible, explain why.**

$\left[\begin{matrix} 5&-6&0\\ -1&12&4\\-8& 3&11\end{matrix} \right]+\left[ \begin{matrix}0& 3&1\\6& 9&1\\4&-2&0\end{matrix} \right]$ $\left[ \begin{matrix}0&-5&7\\3&10&2\end{matrix} \right]-\left[ \begin{matrix}5&11\\6&-1\\2& 8\end{matrix} \right]$

 $\left[\begin{matrix}5&-3&1\\5&21&5\\-4&-4&11\end{matrix}\right]$ **can’t subtract (dimensions do not match)**

 $-3\left[ \begin{matrix} 9\\-13\\ 4\end{matrix} \right]$ $2\left[ \begin{matrix}8&0\\1&-2\end{matrix} \right]+4\left[ \begin{matrix}-1&3\\10&5\end{matrix} \right]$

 $\left[ \begin{matrix}-27\\39\\-12\end{matrix} \right]$$\left[\begin{matrix}12&12\\42&16\end{matrix}\right]$

**If possible, find the product *AB* and *BA*. Use** $A=\left[\begin{matrix} 5&4\\-7&2\\ 11&1\end{matrix} \right]$ and $B=\left[ \begin{matrix}4&12& 0\\2& 3&-1\end{matrix} \right]$

$AB=\left[\begin{matrix}28&72&-4\\-24&-78&-2\\46&135&-1\end{matrix}\right]$$BA=\left[\begin{matrix}64&40\\-22&-13\end{matrix}\right]$

**Evaluate each expression, if possible.**

 $\left[ \begin{matrix}1&2&-1\\0&4&-2\\1&1& 3\end{matrix} \right]∙\left[\begin{matrix} 1&-1&2\end{matrix} \right]$ $-3\left[ \begin{matrix}1&-1\\4& 2\end{matrix} \right]\left(\left[ \begin{matrix}0&3\\1&2\end{matrix} \right]+\left[ \begin{matrix}1& 0\\5&-3\end{matrix} \right]\right)$

 **can’t be multiplied** $\left[\begin{matrix}-15&-17\\-48&0\end{matrix}\right]$