**PreCalculus Ch. 8 Review Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**1. Determine the order of each matrix.**

$\left[\begin{matrix}12&14\\-6&55\\10&13\end{matrix}\right]$ $\left[\begin{matrix}\begin{matrix}1&-6\end{matrix}&\begin{matrix}0&8\end{matrix}\end{matrix}\right]$

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

$\left\{\begin{matrix}2x+3y-z=12\\x+5y+2z=-8\\ y-6z=13\end{matrix}\right.$

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

$\begin{matrix}\\-2R\_{1}+R\_{2}\\6R\_{1}+R\_{3}\end{matrix}\left[\begin{matrix}1&-3&10\\2&4&5\\-6&-1&0\end{matrix}\right]$$-\frac{1}{6}R\_{2} \left[\begin{matrix}1&6&4\\-6&12&-24\\-4&0&7\end{matrix}\right]$

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

$\left[\begin{matrix}1&2&5\\0&1&-3\\0&0&1\end{matrix}\right]$ $\left[\begin{matrix}\begin{matrix}1&-9\end{matrix}&\begin{matrix}0&0\end{matrix}\\\begin{matrix}0&0\end{matrix}&\begin{matrix}1&0\end{matrix}\\\begin{matrix}0&0\end{matrix}&\begin{matrix}0&1\end{matrix}\end{matrix}\right]$

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

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

 c) neither c) neither

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

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

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

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

**7. 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.**

$\left\{\begin{matrix}2x-y=1\\x+4y=-22\end{matrix}\right.$

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

$\left[\begin{matrix}5&y+2\\20&-6\\8&12\end{matrix}\right]=\left[\begin{matrix}5&10\\4x&-6\\8&12\end{matrix}\right]$

**9. If possible, evaluate each expression. Use** $A=\left[\begin{matrix}8&-2&0\\-3&12&5\end{matrix}\right]$ **and** $B=\left[\begin{matrix}0&5&7\\-2&4&1\end{matrix}\right]$

$-6B$

$2A-3B$

**10. If possible, find the product *AB* and *BA*.** $A=\left[\begin{matrix}6&-2&0\\1&3&9\end{matrix}\right]$ **and** $B=\left[\begin{matrix}4\\1\\2\end{matrix}\right]$

**11. Evaluate each expression, if possible.**

 $\left[\begin{matrix}5&-1&2\\6&0&1\end{matrix}\right]∙\left[\begin{matrix}0&5\\7&-2\\-1&2\end{matrix}\right]$ $\left[\begin{matrix}12\\18\\32\end{matrix}\right]∙\left[\begin{matrix}5&-10\end{matrix}\right]$

**12. Find the inverse of the matrix (without using a calculator)**

 $\left[\begin{matrix}3&7\\1&3\end{matrix}\right]$

**13. Find the inverse of the matrix (using a calculator)**

 $\left[\begin{matrix}1&6&0\\2&-5&1\\3&0&4\end{matrix}\right]$

**14. Use an inverse matrix to solve the system of linear equations.**

 $\left\{\begin{matrix}3x-2y+z =11\\x+ y-2z=1\\ y+ 5z=-8\end{matrix}\right.$

**15. Find each determinant (without using a calculator)**

 $A=\left[\begin{matrix}15&10\\-2&6\end{matrix}\right]$

**16. Find the determinant (using a calculator)**

 $A=\left[\begin{matrix}\begin{matrix}-8&-12\\-9&9\end{matrix}&\begin{matrix}1&13\\4&5\end{matrix}\\\begin{matrix}12&0\\3&4\end{matrix}&\begin{matrix}6&-3\\10&-5\end{matrix}\end{matrix}\right]$ $B=\left[\begin{matrix}1&0&-2\\1&4&1\\0&5&3\end{matrix}\right]$

**17. Find the area of the triangle with vertices** $\left(5, -2\right)$**,** $\left(1, -1\right)$ **and** $\left(0, 3\right)$**.**

**18. Use matrices to find the equation of the line passing through the points** $\left(4, -2\right)$ **and** $\left(6, 1\right)$**.**

**ANSWERS:**

**1.** $3×2$ $1×4$

**2.** $\left[\begin{matrix}\begin{matrix}\begin{matrix}2&3\end{matrix}&\begin{matrix}-1&12\end{matrix}\end{matrix}\\\begin{matrix}\begin{matrix}1&5\end{matrix}&\begin{matrix}2&-8\end{matrix}\end{matrix}\\\begin{matrix}\begin{matrix}0&1\end{matrix}&\begin{matrix}-6&13\end{matrix}\end{matrix}\end{matrix}\right]$

**3.** $\left[\begin{matrix}1&-3&10\\0&10&-15\\0&-19&60\end{matrix}\right]$$ \left[\begin{matrix}1&6&4\\1&-2&4\\-4&0&7\end{matrix}\right]$

**4.** a) row-echelon form b) reduced row-echelon form

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

$\left\{\begin{matrix}x+3y-z=5\\ y+z=0\\ z=2\end{matrix}\right.$ $\left(x, y, z\right)\rightarrow \left(13, -2, 2\right)$

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

$\left[\begin{matrix}1&2&3\\0&1&1\\0&0&1\end{matrix}\right]$ (other answers are possible)

**7. 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.**

$\left(-2,-5\right)$

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

$x=5$

 $y=8$

**9. If possible, evaluate each expression. Use** $A=\left[\begin{matrix}8&-2&0\\-3&12&5\end{matrix}\right]$ **and** $B=\left[\begin{matrix}0&5&7\\-2&4&1\end{matrix}\right]$

$-6B=\left[\begin{matrix}0&-30&-42\\12&-24&-6\end{matrix}\right]$ $2A-3B=\left[\begin{matrix}16&-19&-21\\0&12&7\end{matrix}\right]$

**10. If possible, find the product *AB* and *BA*.** $A=\left[\begin{matrix}6&-2&0\\1&3&9\end{matrix}\right]$ **and** $B=\left[\begin{matrix}4\\1\\2\end{matrix}\right]$

$AB=\left[\begin{matrix}22\\25\end{matrix}\right]$ $BA is not possible$

**11. Evaluate each expression, if possible.**

 $\left[\begin{matrix}-9&31\\-1&32\end{matrix}\right]$ $\left[\begin{matrix}60&-120\\90&-180\\160&-320\end{matrix}\right]$

**12. Find the inverse of the matrix (without using a calculator)**

 $\left[\begin{matrix}\frac{3}{2}&\frac{-7}{2}\\\frac{-1}{2}&\frac{3}{2}\end{matrix}\right]$

**13. Find the inverse of the matrix (using a calculator)**

 $\left[\begin{matrix}\frac{2}{5}&\frac{12}{25}&\frac{-3}{25}\\\frac{1}{10}&\frac{-2}{25}&\frac{1}{50}\\\frac{-3}{10}&\frac{-9}{25}&\frac{17}{50}\end{matrix}\right]$

**14. Use an inverse matrix to solve the system of linear equations.**

 $\left⌊\begin{matrix}2\\-3\\-1\end{matrix}\right⌋$

**15. Find each determinant (without using a calculator)**

 $\left|A\right|=110$

**16. Find the determinant (using a calculator)**

 $\left|A\right|=17133$ $\left|B\right|=-3$

**17. Find the area of the triangle with vertices** $\left(5, -2\right)$**,** $\left(1, -1\right)$ **and** $\left(0, 3\right)$**.**

 $A=\frac{15}{2} units^{2}$

**18. Use matrices to find the equation of the line passing through the points** $\left(4, -2\right)$ **and** $\left(6, 1\right)$**.**

 $-3x+2y=-16$