Precalc BC **Inverses** **Name:**

1. Find the inverse of each of the matrices below by hand. *Verify* with calculator.

a) $\begin{bmatrix} 2 & 3 \\ 5 & 8 \end{bmatrix}$ b) $\begin{bmatrix} 3 & 6 \\ 2 & 4 \end{bmatrix}$

2. a) Show (by multiplying them) that the general inverse of $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$

is the matrix $A^{-1} = \begin{bmatrix} \dfrac{d}{ad-bc} & -\dfrac{b}{ad-bc} \\ -\dfrac{c}{ad-bc} & \dfrac{a}{ad-bc} \end{bmatrix}$.

b) Verify that $A^{-1} = \dfrac{1}{\det A} \times \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$

c) In light of your result in part *b* above, under what circumstances will a square matrix *not* have an inverse?

3. Solve using inverses (ie. use your calculator to find the inverses and multiply).

a) $\begin{bmatrix} 2 & 4 \\ 3 & 5 \end{bmatrix}\begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} 6 & 10 \\ 9 & 13 \end{bmatrix}$

b) $\begin{bmatrix} 2 & 1 & 4 \\ 0 & 3 & 2 \\ 4 & 1 & 5 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 4 \\ 4 \\ 9 \end{bmatrix}$

c) $\begin{bmatrix} -2 & 0 & 3 \\ 0 & 2 & 1 \\ 2 & 3 & -2 \end{bmatrix}\begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} 1 \\ 5 \\ 5 \end{bmatrix}$