Inverting a 3 x 3 Matrix

Example

Find the inverse of the matrix $\begin{pmatrix} 2 & 2 & 0 \\ 1 & 4 & -2 \\ 2 & 1 & 1 \end{pmatrix}$

Using your Calculator

1. Mode → Matrix.
2. Select $MatA$. This allows you to input your matrix, which will be saved in a special variable '$MatA$'.
3. Select 3 rows/cols and input each number, pressing = after each.
4. Press AC to start a calculation.
5. You want to write $MatA^{-1}$. To get the $MatA$ in your expression: OPTN for the matrix menu, then select $MatA$ to insert it into your expression.
   Use the special x^{-1} key on your calculator, because the general power button will not work in matrix mode.
6. Press =, and look appropriately smug.

Further Example

$$A = \begin{pmatrix} -2 & 3 & -3 \\ 0 & 1 & 0 \\ 1 & -1 & 2 \end{pmatrix},$$

and the matrix $\mathbf{B}$ is such that $(\mathbf{AB})^{-1} = \begin{pmatrix} 8 & -17 & 9 \\ -5 & 10 & -6 \\ -3 & 5 & -4 \end{pmatrix}.$

(a) Show that $\mathbf{A}^{-1} = \mathbf{A}$.

(b) Find $\boldsymbol{B}^{-1}$.

Test Your Understanding

[June 2011 Q7] The matrix $\mathbf{M}$ is given by

$$\mathbf{M} = \begin{pmatrix} k & -1 & 1 \\ 1 & 0 & -1 \\ 3 & -2 & 1 \end{pmatrix}, \quad k \neq 1.$$

(a) Show that $\det \mathbf{M} = 2 - 2k$.   (2)

(b) Find $\mathbf{M}^{-1}$, in terms of k.   (5)

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