Chapter 9 / **Example 5**

Solving equations with matrices

Solve the systems of equations by first forming a matrix equation.

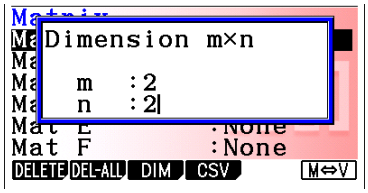
a $\begin{cases} 10x-5y=35 \\ -3x+7y=23 \end{cases}$ **b** $\begin{cases} 4s-3t-2z=0 \\ 2s+2t+3z=-6 \\ 6s+t-z=2 \end{cases}$

$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 10 & -5 \\ -3 & 7 \end{pmatrix}^{-1} \begin{pmatrix} 35 \\ 23 \end{pmatrix}$.

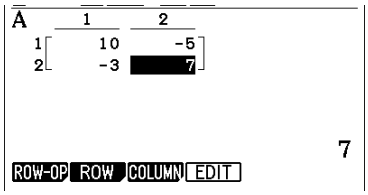
Press MENU 1 to display the Run-Matrix screen for arithmetical calculations.

Press F3 ▸MAT/VCT F3 DIM.

Change the dimensions of the matrix to 2 × 2 and press EXE.



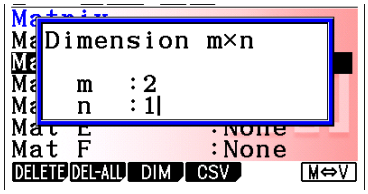
Enter the values of the elements of the matrix ***A***, using EXE to move through the matrix.



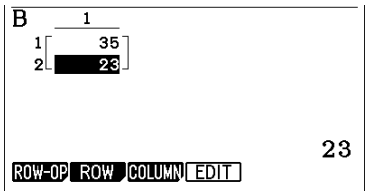
Press EXIT, select Mat B.

Press F3 ▸MAT/VCT F3 DIM.

Change the dimensions of the matrix to 2 × 1 and press EXE.



Enter the values of the elements of the matrix ***B***, using EXE to move through the matrix.



Chapter 9 / **Example 5**

Solving equations with matrices

Press EXIT twice to return to the calculation screen.

Press OPTN F2 MAT/VCT F1 Mat.

Press ALPHA X,θ,T [A].

Press SHIFT) [x^{-1}].

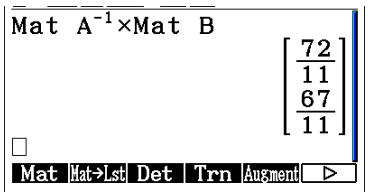
Press ×[format]

Press F1 Mat.

Press ALPHA X,θ,T [B] and press EXE.

The GDC displays the result in fractional form.

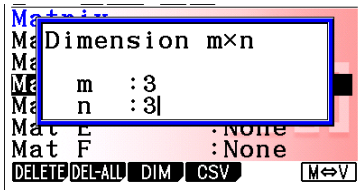
$x = \frac{72}{11}$ and $y = \frac{67}{11}$.



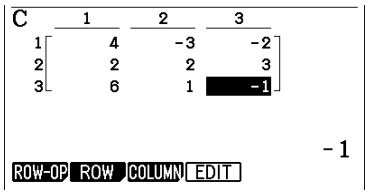
Press EXIT twice and press F3 ▸MAT/VCT.

Select Mat C and press F3 DIM.

Change the dimensions of the matrix to 3 × 3 and press EXE.



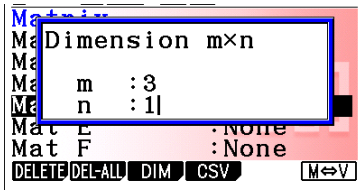
Enter the values of the elements of the matrix ***C***, using EXE to move through the matrix.



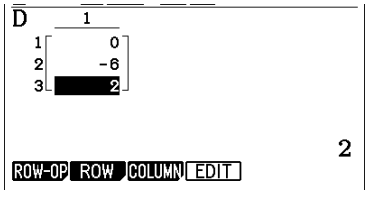
Press EXIT, select Mat D.

Press F3 ▸MAT/VCT F3 DIM.

Change the dimensions of the matrix to 3 × 1 and press EXE.



Enter the values of the elements of the matrix ***D***, using EXE to move through the matrix.



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Solving equations with matrices

Press [EXIT] twice to return to the calculation screen.

Press [OPTN] [F2] MAT/VCT [F1] Mat.

Press [ALPHA] [X,θ,T] [C].

Press [SHIFT] [)] [x^{-1}].

Press [×][format]

Press [F1] Mat.

Press [ALPHA] [X,θ,T] [D] and press [EXE].

The GDC displays the result in fractional form.

$s = -\frac{1}{3}$, $t = \frac{4}{3}$ and $z = -\frac{8}{3}$.