

## MATRICES ON THE CALCULATOR

### ADDITION, SUBTRACTION, AND SCALAR MULTIPLICATION:

You can enter and manipulate matrices with your graphing calculator (see directions below):

$$A = \begin{bmatrix} 2 & -1 \\ 7 & 4 \end{bmatrix} \quad B = \begin{bmatrix} 6 & -3 \\ 1 & 4 \end{bmatrix} \quad [A] + [B] = \begin{bmatrix} 8 & -4 \\ 8 & 8 \end{bmatrix}$$

### Entering the Matrix into the Calculator

- Go into the Matrix Menu
  - $2^{\text{nd}}$  **MATRIX** (the  $x^{-1}$  key)
    - $\blacktriangleright$  (right arrow) over to **EDIT**
- Select a Matrix
  - **ENTER** for 1:[A] (This is Matrix A) OR
  - Use  $\blacktriangledown$  (down arrow) to select another Matrix in the list and push **ENTER**
- Input the Dimension (size) of the Matrix (*Rows x Columns*)
  - # of Rows **ENTER**
  - # of Columns **ENTER**
- Input the elements (values) of the Matrix
  - Type in each # so that the matrix in the calculator looks *exactly* like the matrix on the paper.
  - Use the arrow keys to move within the Matrix.
- When the Matrix is complete
  - $2^{\text{nd}}$  **QUIT**

### To Perform Operations on Matrices (Addition, Subtraction, Scalar Multiplication)

- Enter all the matrices you need to perform the operation(s).
- Go into the Matrix Menu
  - $2^{\text{nd}}$  **MATRIX** (the  $x^{-1}$  key)
    - Under **NAMES**, press **ENTER** for 1:[A] (This is Matrix A) OR
    - Use  $\blacktriangledown$  (down arrow) to select another Matrix in the list and push **ENTER**
- Name of the first Matrix will appear on the Home screen. Example: [A]
- Push the desired operation key:  $+$ ,  $-$ ,  $\times$  Example: [A] +

- Go into the Matrix Menu
  - $2^{\text{nd}}$  **MATRIX** (the  $x^{-1}$  key)
  - Use  $\blacktriangledown$  to select the other Matrix in the list and push **ENTER**
- Name of second Matrix will appear on the Home screen. Example: [A] + [B]
- Push **ENTER** and the result will be displayed on the Home screen.

Use your calculator to perform the appropriate operation on the given matrices

$$A = \begin{bmatrix} 1 & 0 & 4 \\ 6 & 3 & -3 \\ 0 & -3 & 4 \end{bmatrix} \quad B = \begin{bmatrix} 2 & 7 & 0 \\ -4 & 1 & 8 \\ -2 & -4 & 1 \end{bmatrix} \quad C = \begin{bmatrix} 4 & 0 \\ -9 & 2 \\ 1 & 5 \end{bmatrix} \quad D = \begin{bmatrix} 0 & 1 \\ -9 & -1 \\ 4 & 3 \end{bmatrix} \quad E = \begin{bmatrix} 1 & 0 & 3 \\ 4 & 0 & -7 \\ 6 & 4 & 3 \end{bmatrix}$$

1.  $B + A$  1. \_\_\_\_\_

2.  $D - C$  2. \_\_\_\_\_

3.  $3E$  3. \_\_\_\_\_

4.  $B + A - C$  4. \_\_\_\_\_

5.  $4A - 3E + B$  5. \_\_\_\_\_

6.  $A - B + E$

6. \_\_\_\_\_

7.  $-3B - 6A$

7. \_\_\_\_\_

8.  $8C - 3C$

8. \_\_\_\_\_

9.  $E + 2A - 9B$

9. \_\_\_\_\_

10.  $6C + 4D - 2C$

10. \_\_\_\_\_

$$A = \begin{bmatrix} 2 & -5 \\ -1 & 7 \end{bmatrix}$$

$$B = \begin{bmatrix} 11 \\ -2 \\ 5 \end{bmatrix}$$

$$C = \begin{bmatrix} 2 & 0 & -4 \\ 8 & 3 & -4 \\ -9 & 2 & 5 \end{bmatrix}$$

$$D = [4 \quad -1 \quad 6]$$

$$E = \begin{bmatrix} 6 & -8 \\ 0 & 3 \end{bmatrix}$$

$$F = \begin{bmatrix} 2 & 4 \\ -5 & 3 \\ 1 & 6 \end{bmatrix}$$

$$G = \begin{bmatrix} 10 & 1 & 0 \\ 2 & -4 & 5 \end{bmatrix}$$

$$H = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$I = \begin{bmatrix} 8 \\ -4 \\ 5 \end{bmatrix}$$

$$J = \begin{bmatrix} 1 & -4 & 7 \\ 3 & 6 & 9 \\ -2 & 0 & 2 \end{bmatrix}$$

$$K = \begin{bmatrix} 8 & 4 & -3 \\ 7 & 1 & 0 \end{bmatrix}$$

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List the dimensions for each specific matrix.

11. A \_\_\_\_\_

12. B \_\_\_\_\_

13. I \_\_\_\_\_

14. D \_\_\_\_\_

15. C \_\_\_\_\_

16. J \_\_\_\_\_

17. K \_\_\_\_\_

18. F \_\_\_\_\_

If possible, identify the element in the specific locations of the matrix.

19. Matrix C,  $c_{2,3}$  \_\_\_\_\_

20. Matrix K,  $k_{1,3}$  \_\_\_\_\_

21. Matrix A,  $a_{2,2}$  \_\_\_\_\_

22. Matrix I,  $i_{1,1}$  \_\_\_\_\_

23. Matrix D,  $d_{1,3}$  \_\_\_\_\_

24. Matrix J,  $j_{3,3}$  \_\_\_\_\_

25. Matrix B,  $b_{3,1}$  \_\_\_\_\_

26. Matrix G,  $g_{2,3}$  \_\_\_\_\_