

Instructions: For each part of this Lab, use Maple to carry out the indicated matrix operations.

$$\text{Let } A = \begin{bmatrix} -3 & 2 & 1 \\ 2 & -1 & 4 \\ 3 & 1 & 1 \end{bmatrix}, B = \begin{bmatrix} 0 & -1 & 2 \\ 2 & 3 & -4 \\ 1 & -1 & 0 \end{bmatrix}, C = \begin{bmatrix} 2 & -1 \\ 3 & 5 \\ 0 & 4 \end{bmatrix}$$

$$D = \begin{bmatrix} 1 & -2 & 3 \\ 4 & 0 & 6 \end{bmatrix}, E = \begin{bmatrix} 4 \\ -1 \\ 5 \end{bmatrix}, F = \begin{bmatrix} -2 \\ 0 \\ 3 \end{bmatrix}.$$

1. Define each of the matrices given above using whichever Maple input method you prefer.

2. Compute each of the following, or state that they are not possible.

- | | | |
|-------------|---------------|----------------|
| (a) $A + B$ | (e) $3A - 4B$ | (i) $B(E + F)$ |
| (b) $C + D$ | (f) AB | (j) $BE + F$ |
| (c) $E + F$ | (g) BA | (k) CD |
| (d) $3C$ | (h) $BE + BF$ | (l) DC |

3. Compute each of the following or state that they are not possible.

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|-----------------|-----------------|--------------------|
| (a) A^T | (e) $D^T + C$ | (i) $A^{-1}B^{-1}$ |
| (b) $(A + B)^T$ | (f) A^{-1} | (j) $B^{-1}A^{-1}$ |
| (c) $A^T + B^T$ | (g) B^{-1} | |
| (d) $C^T + D$ | (h) $(AB)^{-1}$ | |

4. Use Maple to list the following matrix entries:

- | | | | |
|---------------|---------------|---------------|---------------|
| (a) $A_{2,1}$ | (b) $A_{1,2}$ | (c) $B_{2,3}$ | (d) $D_{1,2}$ |
|---------------|---------------|---------------|---------------|

5. Use Matrices to solve the following system of equations:

$$1x_1 - 3x_2 + 2x_3 + 0x_4 + 1x_5 = -2$$

$$2x_1 - 1x_2 + 0x_3 + 4x_4 + 0x_5 = 1$$

$$3x_1 - 1x_2 + 0x_3 - 3x_4 + 2x_5 = 0$$

$$1x_1 - 2x_2 + 3x_3 + 1x_4 + 0x_5 = 2$$

$$0x_1 + 2x_2 - 3x_3 + 0x_4 + 1x_5 = 1$$