

LINEAR ALGEBRA

$$A = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} \quad B = \begin{pmatrix} 0 \\ -1 \\ 5 \end{pmatrix} \quad C = \begin{pmatrix} 1 & 0 & -1 \\ 2 & 3 & -2 \\ 0 & 4 & 5 \\ -2 & 0 & 1 \end{pmatrix} \quad D = \begin{pmatrix} -1 & 3 & 0 & -2 \\ 1 & 2 & 0 & -1 \\ 2 & -2 & 4 & 0 \end{pmatrix} \quad E = \begin{pmatrix} 2 & 0 & 1 \\ 1 & 2 & 0 \\ 0 & 2 & 1 \end{pmatrix} \quad F = \begin{pmatrix} -2 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

COMPUTE:

- | | | |
|-----------|--------------------------------------|--------------|
| 1) $A+B$ | 11) $D'C \times \times E$ | 21) DC |
| 2) CA | 12) $A \otimes B'$ | 22) $A'F$ |
| 3) $A'C'$ | 13) CF | 23) FA |
| 4) $D'A$ | 14) FD | 24) $(DC)'B$ |
| 5) EF | 15) $E+F$ | 25) $C'D'B$ |
| 6) FE | 16) $A'EB$ | |
| 7) $A'B$ | 17) $F^{-1}E$ | |
| 8) $B'A$ | 18) $E \times \times (B \otimes A')$ | |
| 9) AB' | 19) $A' \underline{1}$ | |
| 10) BA' | 20) CD | |

26) THINK OF A SET TOGETHER WITH A BINARY OPERATION ON THAT SET AND CHECK AGAINST THE DEFINITION OF A GROUP

27) IS THE FOLLOWING SET OF VECTORS LINEARLY INDEPENDENT? $\left\{ \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}, \begin{pmatrix} 0 \\ 2 \\ -1 \end{pmatrix} \right\}$

28) SOLVE FOR Y IF X IS INVERTIBLE AND $XY = Z$

29) IF $W = X(X'X)^{-1}X'$, FIND WW

30) SIMPLIFY $(XX')^{-1}X'$ WHERE $X = QR$ WITH $Q'Q = I$ AND R INVERTIBLE