Section 7.2

Exercise 1. Given the matrices

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

Find $A + B$, $3A - 2B$, AB, BA

Exercise 2. Find the derivative of

$$\begin{pmatrix} 2e^t & e^{-t} & \cos 2t \\ -e^t & 3e^{-t} & \sin 2t \\ -e^t & -2e^{-t} & 2\sin 2t \end{pmatrix}$$

Exercise 3. Verify that the given vector satisfies the differential equation

$$x'(t) = \begin{pmatrix} 2 & -1 \\ 3 & -2 \end{pmatrix} x(t) + \begin{pmatrix} 1 \\ -1 \end{pmatrix} e^t, \qquad x(t) = \begin{pmatrix} e^t \\ 0 \end{pmatrix} + 2 \begin{pmatrix} 1 \\ 1 \end{pmatrix} t\, \mathrm{e}^t \,.$$