BSc Software Design (Game & Web Dev)
Year 1 Maths Tutorial #5

Q.1. For the matrices below calculate, where possible, $C=A.B$ and $D=B.A$ If both C and D exist check them for equality:

(a) $A=\begin{pmatrix}1 & 2 & 4\\ -3 & 3 & 6\\ 2 & 0 & -3\end{pmatrix}$ $B=\begin{pmatrix}1 & 0\\ -2 & 3\\ 4 & 5\end{pmatrix}$

(b) $A=\begin{pmatrix}-1 & 4\\ 6 & 9\\ 0 & -2\end{pmatrix}$ $B=\begin{pmatrix}5 & -2 & 8\\ 0 & 4 & 5\end{pmatrix}$

(c) $A=\begin{pmatrix}0 & 9 & 0\\ 1 & 0 & -6\\ 2 & 1 & 0\end{pmatrix}$ $B=\begin{pmatrix}6 & 0 & -54\\ -12 & 0 & 0\\ 1 & 18 & -9\end{pmatrix}$

(d) $A=\begin{pmatrix}1 & 2 & 4\\ -3 & 3 & 6\\ 2 & 0 & -3\end{pmatrix}$ $B=\begin{pmatrix}-9 & 6 & 0\\ 3 & -11 & -18\\ -6 & 4 & 9\end{pmatrix}$

Q.2. Calculate the determinant of each of the following matrices:

(a) $A=\begin{pmatrix}0 & -2 & 4\\ -11 & 8 & 5\\ -3 & 0 & -5\end{pmatrix}$

(b) $A=\begin{pmatrix}-1 & 4\\ 6 & 9\end{pmatrix}$

(c) $A=\begin{pmatrix}0 & 1 & 0\\ 5 & 0 & -6\\ 1 & 1 & 0\end{pmatrix}$

(d) $A=\begin{pmatrix}1 & 2 & 3\\ 4 & 5 & 6\\ 7 & 8 & 9\end{pmatrix}$

Q.3. Determine the values of x for which the following matrices are non-singular.

(a) $A=\begin{pmatrix}1-x & 0 & -4\\ 3 & 2+x & 6\\ 0 & 0 & -3\end{pmatrix}$

(b) $A=\begin{pmatrix}-1+x & 0 & 0\\ 2 & 9+x & 0\\ 0 & -2 & 3-x\end{pmatrix}$

(c) $A=\begin{pmatrix}1-x & 9 & 0\\ 2 & 4+x & -6\\ 2 & 4 & -6+x\end{pmatrix}$