BSc Software Design (Game Dev & Cloud Comp)
Year 1 Maths Tutorial
Matrices II

Q.1. (a) Determine all values of *x* for which the matrices below are non-singular:

(i) $\begin{pmatrix} 0 & 4 & -1 \\ x & -2 & 3 \\ 5 & 1-x & 8 \end{pmatrix}$ (ii) $\begin{pmatrix} 5-x & 5 & 7 \\ 0 & 6-x & 4 \\ 0 & 0 & 8+x \end{pmatrix}$

(b) Calculate the inverse of the following matrix:

$$\begin{pmatrix} 1 & 0 & -3 \\ 6 & 7 & 2 \\ 0 & -1 & 1 \end{pmatrix}$$

(c) Solve the system of linear equations:

$$\begin{aligned} x-3z&=1 \\ 6x+7y+2z&=2 \\ -y+z&=3 \end{aligned}$$

Q.2. (a) Determine all values of *x* for which the matrices below are non-singular:

(i) $\begin{pmatrix} 1 & -1 & 1 \\ x-1 & 0 & 4 \\ -3 & 5x & 3 \end{pmatrix}$ (ii) $\begin{pmatrix} 4+x & 0 & 0 \\ -4 & x-1 & 0 \\ 3 & -5 & 8-x \end{pmatrix}$

(b) Calculate the inverse of the following matrix:

$$\begin{pmatrix} 1 & 3 & 2 \\ -5 & 3 & 1 \\ 1 & 1 & -1 \end{pmatrix}$$

(c) Solve the system of linear equations:

$$\begin{aligned} x+3y+2z&=0 \\ -5x+3y+z&=1 \\ x+y-z&=-2 \end{aligned}$$