INSTRUCTIONS

Full marks will be awarded for the correct solutions to **ALL QUESTIONS**. This paper will be marked out of a TOTAL MAXIMUM MARK OF 100. Credit will be given for clearly presented solutions.

BSc (Hons) in Computer Games Development

YEAR 1

CLASS TEST 2

1. Let

$$A = \frac{1}{2}\begin{pmatrix} -4 & 8 & 2 \\ -3 & 5 & 3 \\ -2 & 4 & 0 \end{pmatrix} \qquad B = \begin{pmatrix} 6 & -4 & -7 \\ 3 & -2 & -3 \\ 1 & 0 & -2 \end{pmatrix}$$

Determine $A.B$. What comment can you make about the matrix A?

20 marks

2. Let

$$A = \begin{pmatrix} -5 & 1 & 4 \\ -1 & 1 & 1 \\ -4 & 1 & 3 \end{pmatrix}$$

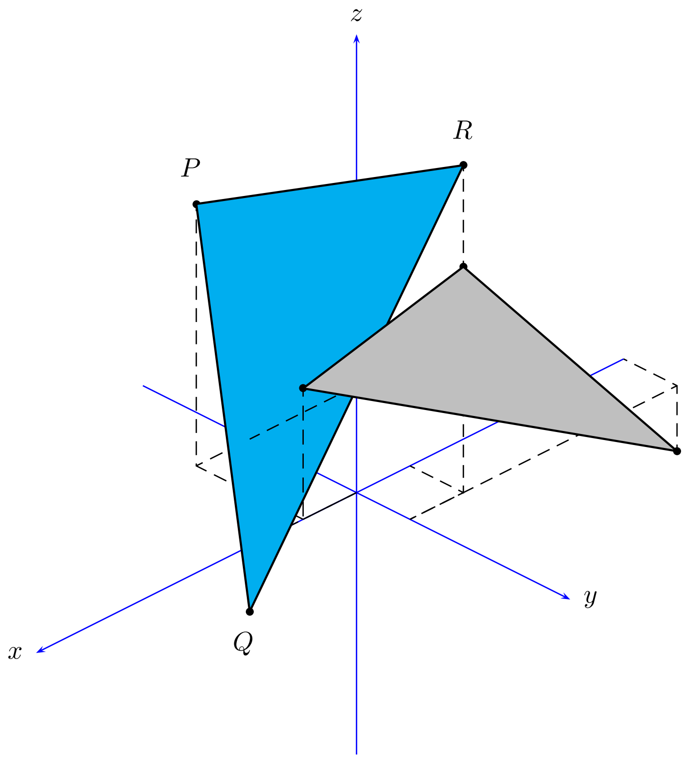
By a sequence of *row operations* find A^{-1}, the *inverse* of A. Use this inverse to find the solution of the following system of linear equations.

$$\begin{aligned} -5x + y + 4z &= 0 \\ -x + y + z &= 2 \\ -4x + y + 3z &= 1 \end{aligned}$$

50 marks

3. Consider the following points in $\mathbb{R}^3$.

$$P(7,2,3) \quad , \quad Q(3,-2,1) \quad , \quad R(4,0,9)$$



Let $T_A : \mathbb{R}^3 \longrightarrow \mathbb{R}^3$ such that

$$T(x) = Ax$$

denote a *matrix transformation* with *standard matrix* A. The *standard matrix* required to rotate a point *anti-clockwise* about the positive y-axis through an angle of 180^o is given as

$$A = \begin{pmatrix} -1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{pmatrix}$$

Rotate the triangle PQR using A.

30 marks