

2.1 Properties of Matrices

2.1.1 Introduction to Matrices / 2.1.2 Determinants of Matrices / 2.1.3 Inverses of Matrices

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Total Marks

/12

1 (a)

$$\mathbf{M} = \begin{pmatrix} 2 & a & 4 \\ 1 & -1 & -1 \\ -1 & 2 & -1 \end{pmatrix}$$

where a is a constant.

(a) For which values of a does the matrix \mathbf{M} have an inverse?

(2 marks)

(b) Given that \mathbf{M} is non-singular,

(b) find \mathbf{M}^{-1} in terms of a

(4 marks)

2

$$\mathbf{M} = \begin{pmatrix} k & 5 & 7 \\ 1 & 1 & 1 \\ 2 & 1 & -1 \end{pmatrix}$$

Given that $k \neq 4$, find, in terms of k , the inverse of the matrix \mathbf{M} .

(4 marks)

3

$$\mathbf{M} = \begin{pmatrix} 2 & -1 & 1 \\ 3 & k & 4 \\ 3 & 2 & -1 \end{pmatrix} \text{ where } k \text{ is a constant}$$

Find the values of k for which the matrix \mathbf{M} has an inverse.

(2 marks)