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**4.**

$$\mathbf{M} = \begin{pmatrix} 6 & k & 2 \\ k & 5 & 0 \\ 2 & 0 & 7 \end{pmatrix}$$

where $k$ is a constant.

Given that 3 is an eigenvalue of **M**,

(a) determine the possible values of $k$.

**(3)**

Given that $k < 0$

(b) determine the other eigenvalues of **M**.

**(3)**

(c) Determine a normalised eigenvector corresponding to the eigenvalue 3

**(3)**

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**Question 4 continued**

**Q4**

**(Total 9 marks)**