Advanced Higher Maths
SQA 2018 Paper
Question 11

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(a) Obtain the matrix, A, associated with an anticlockwise rotation of $\frac{\pi}{3}$ radians about the origin. 1

(b) Find the matrix, B, associated with a reflection in the x-axis. 1

(c) Hence obtain the matrix, P, associated with an anticlockwise rotation of $\frac{\pi}{3}$ radians about the origin followed by reflection in the x-axis, expressing your answer using exact values. 2

(d) Explain why matrix P is not associated with rotation about the origin. 1

Answers/method:

(a) $\begin{pmatrix} \cos\frac{\pi}{3} & -\sin\frac{\pi}{3} \\ \sin\frac{\pi}{3} & \cos\frac{\pi}{3} \end{pmatrix}$

(b) $\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$

(c) $\frac{1}{2}\begin{pmatrix} 1 & -\sqrt{3} \\ -\sqrt{3} & -1 \end{pmatrix}$

(d) Compare the elements of P with the general form of a rotation matrix, and conclude that they are inconsistent.

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