AQA Qualifications

AQA Level 2 Certificate
FURTHER MATHEMATICS
Level 2 (8360)

Mark Scheme
Worksheet 6
Matrices 2

Version 2.0

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The GCSE Mathematics Department
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Glossary for Mark Schemes

These examinations are marked in such a way as to award positive achievement wherever possible. Thus, for these papers, marks are awarded under various categories.

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
M Dep	A method mark dependent on a previous method mark being awarded.
B Dep	A mark that can only be awarded if a previous independent mark has been awarded.
ft	Follow through marks. Marks awarded following a mistake in an earlier step.
SC	Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
oe	Or equivalent. Accept answers that are equivalent. eg, accept 0.5 as well as $\frac{1}{2}$

6 Matrices 2

Question 1

Each question 2 marks. M1 for a correct row by column multiplication. A1 for the correct answer.

(a) $\begin{pmatrix} 9 & 5 \\ 41 & 24 \end{pmatrix}$ (b) $\begin{pmatrix} -10 & 17 \\ -7 & 12 \end{pmatrix}$ (c) $\begin{pmatrix} 6 & -3 \\ 9 & 12 \end{pmatrix}$

(d) $\begin{pmatrix} 26 & 9 \\ 19 & 7 \end{pmatrix}$ (e) $\begin{pmatrix} 2 & -3 \\ -1 & 1 \end{pmatrix}$ (f) $\begin{pmatrix} -13 & 0 \\ -10 & 1 \end{pmatrix}$

Question 2

Each question 2 marks. M1 for a correct row by column multiplication. A1 for the correct answer.

(a) $\begin{pmatrix} 4 & 0 \\ -5 & 1 \end{pmatrix}$ (b) $\begin{pmatrix} 13 & 1 \\ -16 & -2 \end{pmatrix}$ (c) $\begin{pmatrix} -20 & 5 \\ 15 & -10 \end{pmatrix}$

(d) $\begin{pmatrix} -6 \\ 13 \end{pmatrix}$ (e) $\begin{pmatrix} -4 & 1 \\ 3 & -2 \end{pmatrix}$ (f) $\begin{pmatrix} 3 & 0 \\ 0 & 3 \end{pmatrix}$

Question 3

$-6 + 7a = 22$ M1

$a = 4$ A1

Question 4

Work out the values of a, b and c.

$$\begin{pmatrix} 2+2a & 6+ab \\ 5 & 9+b \end{pmatrix} = \begin{pmatrix} 12 & 26 \\ c & 13 \end{pmatrix}$$

$a = 5$, $b = 4$, $c = 5$ B1, B1, B1

Question 5

(4, 3) B2 (B1 for (4, ?), (?, 3) or $\begin{pmatrix}4\\3\end{pmatrix}$.

Question 6

$2m + 3n = -2$, $m + n = 0$ M1 for either, A1 for both

Attempt to solve M1

$m = 2$, $n = -2$ A1

Question 7

A = $\begin{pmatrix}0 & 1\\1 & 0\end{pmatrix}$ B1

Rotation $\begin{pmatrix}0 & 1\\-1 & 0\end{pmatrix}$ B1

Combined $\begin{pmatrix}0 & 1\\-1 & 0\end{pmatrix}\begin{pmatrix}0 & 1\\1 & 0\end{pmatrix} = \begin{pmatrix}1 & 0\\0 & -1\end{pmatrix}$ M1 Multiplication in correct order.

A1 $\begin{pmatrix}1 & 0\\0 & -1\end{pmatrix}$

Question 8

Reflection, in the line $y = -x$ B1, B1

Question 9 (Non-calculator)

Vertices of image A' $(h, 0)$ B' (h, h) $C'(0, h)$ Any 1 correct B1

Area of $OA'B'C'$. $= h2$ M1

$h = 3\sqrt{3}$ A1

Question 10

$BA = \begin{pmatrix} -3 & 0 \\ 0 & 3 \end{pmatrix}$ B1

$\begin{pmatrix} -3 & 0 \\ 0 & 3 \end{pmatrix}\begin{pmatrix} 2 \\ 7 \end{pmatrix} = \begin{pmatrix} -6 \\ 21 \end{pmatrix}$ B1

Show this satisfies $7x + 2y = 0$ M1