AQA Qualifications

AQA Level 2 Certificate

FURTHER MATHEMATICS

Level 2 (8360)

Mark Scheme

Worksheet 5

Matrices 1

Version 2.0

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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 $\frac{1}{2}$

5 Matrices 1

Question 1

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

(a) $\begin{pmatrix} 30 \\ -16 \end{pmatrix}$ (b) $\begin{pmatrix} -15 \\ -20 \end{pmatrix}$ (c) $\begin{pmatrix} 10 & -4 \\ 12 & -6 \end{pmatrix}$

(d) $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$ (e) $\begin{pmatrix} -24 & 42 \\ -6 & -18 \end{pmatrix}$ (f) $\begin{pmatrix} 0 \\ 0 \end{pmatrix}$

Question 2

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

(a) $\begin{pmatrix} -1 & 10 \\ 3 & -9 \end{pmatrix}$ (b) $\begin{pmatrix} 0 & -20 \\ 17 & 16 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

(d) $\begin{pmatrix} 34 & 19 \\ 2 & 60 \end{pmatrix}$ (e) $\begin{pmatrix} 0 & -5 \\ 1 & -11 \end{pmatrix}$ (f) $\begin{pmatrix} 11 & -19 \\ 13 & -22 \end{pmatrix}$

Question 3 (Non-calculator)

3 marks per question. 1 mark for multiplication of row by column, 1 mark for 2 simplified elements, 1 for other 2 elements correct. Part (c) 2 marks.

(a) $\begin{pmatrix} -1 & -2\sqrt{2} \\ -10\sqrt{2} & -12 \end{pmatrix}$ (b) $\begin{pmatrix} \frac{3}{2} & -5 \\ -\frac{11}{2} & 21 \end{pmatrix}$ (c) $\begin{pmatrix} 23 & 16 \\ 56 & 39 \end{pmatrix}$

(d) $\begin{pmatrix} 25 & 3\sqrt{3} \\ -10\sqrt{3} & 2 \end{pmatrix}$ (e) $\begin{pmatrix} \frac{7}{6} & 3 \\ \frac{19}{12} & 3 \end{pmatrix}$ (f) $\begin{pmatrix} 16 & 2\sqrt{2}+2\sqrt{3} \\ 7\sqrt{2}+7\sqrt{3} & 17 \end{pmatrix}$

Question 4

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

(f) 3 marks. 2 for 1 pair correctly multiplied, 1 for final answer.

(a) $\begin{pmatrix} -p \\ -p-1 \end{pmatrix}$ (b) $\begin{pmatrix} 3x \\ 3y \end{pmatrix}$ (c) $\begin{pmatrix} 2m \\ m \end{pmatrix}$

(d) $\begin{pmatrix} -2a & 0 \\ 0 & 2a \end{pmatrix}$ (e) $\begin{pmatrix} 12t & 0 \\ 0 & 12t \end{pmatrix}$ (f) $\begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}\begin{pmatrix} 3 \\ -2 \end{pmatrix} = \begin{pmatrix} -3 \\ -2 \end{pmatrix}$

Question 5

(a) to (d) 2 marks each

(e) and (f) 3 marks each, 1 for a correct multiplication, 1 for two elements correct, 1 for all correct.

(a) $\begin{pmatrix} 2x^2+9 & 6x^2 \\ -17x & -15x \end{pmatrix}$ (b) $\begin{pmatrix} -23a & 41a \\ -24 & -5 \end{pmatrix}$ (c) $\begin{pmatrix} x^2 & 0 \\ 2x & x^2 \end{pmatrix}$

(d) $\begin{pmatrix} 2y & 3y^2+y \\ -6 & -9y+x \end{pmatrix}$ (e) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (f) $\begin{pmatrix} 9x^2+27 & -12x-3 \\ -36x-9 & x^2+2x+28 \end{pmatrix}$