HIGHER

2.8 Matrices: Solving Simultaneous Equations With the Inverse Matrix: 10-minute Pack

EDEXCEL 4MA1 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Given M = [[1, -1], [2, 3]] and c = $[4, 11]^T$, write down the matrix equation M x = c and state whether det(M) is zero or non zero.

(Total for Question 1 is 1 mark)

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2 M = [[3, -1], [4, -4]]
Find M^{-1}, the inverse of M.

(Total for Question 2 is 3 marks)

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3 Write the simultaneous equations

$5x - y = 20$

$6x + 2y = 8$

in the form M [x; y] = c, where M is a 2 x 2 matrix and c is a column vector.

(Total for Question 3 is 2 marks)

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4 Write the simultaneous equations

$x + 5y = -17$

$3x - 2y = 17$

in the form M [x; y] = c, where M is a 2 x 2 matrix and c is a column vector.

(Total for Question 4 is 2 marks)

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Mark scheme · 2.8 Matrices: Solving Simultaneous Equations With the Inverse Matrix: 10-minute Pack

Question 1

M x = c written correctly and det(M) = 1*3 - (-1)*2 = 3 +2 = 5 stated non zero **B1**

Answer: M x = [[1,-1],[2,3]] $[x]^T$ = $[4,11]^T$ and det(M) = 5, non zero

Question 2

determinant = (3)(-4) - (-1)(4) = -8 **M1**

swaps the leading diagonal and changes the signs of the other two entries **M1**

M^{-1} = (1/8)[[4, -1], [4, -3]] **A1**

Answer: (1/8)[[4, -1], [4, -3]]

Question 3

M = [[5, -1], [6, 2]] **B1**

c = [20; 8] **B1**

Answer: [[5, -1], [6, 2]] [x; y] = [20; 8]

Question 4

M = [[1, 5], [3, -2]] **B1**

c = [-17; 17] **B1**

Answer: [[1, 5], [3, -2]] [x; y] = [-17; 17]

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