1.13 Core Pure: Matrices and Transformations Depth: 10-minute Pack

EDEXCEL 9FM0 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 The matrix M is given by M = ((0, 1), (-4, 5)).

(a) Find the characteristic equation of M and hence find its eigenvalues. **(3)**

(b) Find an eigenvector corresponding to each eigenvalue, giving each as a vector with integer components in simplest form. **(3)**

(c) Find M^2. **(2)**

(Total for Question 1 is 8 marks)

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Mark scheme · 1.13 Core Pure: Matrices and Transformations Depth: 10-minute Pack

Question 1

(a) forms det(M - λ I) = 0	**M1**
(a) λ^2 - 5lambda + 4 = 0	**A1**
(a) λ = 1 and λ = 4	**A1**
(a) Answer: λ = 1, 4	
(b) solves (M - λ I) v = 0 for the first eigenvalue	**M1**
(b) for λ = 1: (1, 1)	**A1**
(b) for λ = 4: (1, 4)	**A1**
(b) Answer: λ = 1: (1, 1); λ = 4: (1, 4)	
(c) multiplies M by itself 2 times (or uses the diagonalisation PD^2P^{-1})	**M1**
(c) ((-4, 5), (-20, 21))	**A1**
(c) Answer: ((-4, 5), (-20, 21))	

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