2. **In this question you must show all stages of your working.**

Solutions relying entirely on calculator technology are not acceptable.

$$\mathbf{M} = \begin{pmatrix} 2 & 0 & 0 \\ 0 & 1 & 4 \\ 3 & -2 & -3 \end{pmatrix}$$

(a) Determine $\mathbf{M}^{-1}$

(3)

The transformation represented by **M** maps the plane Π_1 to the plane Π_2

The point (x, y, z) on Π_1 maps to the point (u, v, w) on Π_2

(b) Determine x, y and z in terms of u, v and w as appropriate.

(3)

The plane Π_1 has equation

$$3x - 7y + 2z = -3$$

(c) Find a Cartesian equation for Π_2

Give your answer in the form $au + bv + cw = d$ where a, b, c and d are integers to be determined.

(2)

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Question 2 continued

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Question 2 continued

(Total for Question 2 is 8 marks)