2.

$$\mathbf{T} = \begin{pmatrix} 2 & 3 & 7 \\ 3 & 2 & 6 \\ a & 4 & b \end{pmatrix} \qquad \mathbf{U} = \begin{pmatrix} 6 & -1 & -4 \\ 15 & c & -9 \\ -8 & a & 5 \end{pmatrix}$$

where a, b and c are constants.

Given that $\mathbf{TU} = \mathbf{I}$

(a) determine the value of a, the value of b and the value of c

(4)

The transformation represented by the matrix $\mathbf{T}$ transforms the line l_1 to the line l_2

Given that l_2 has equation

$$\frac{x-1}{3} = \frac{y}{-4} = z + 2$$

(b) determine a Cartesian equation for l_1

(4)

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Question 2 continued

(Total for Question 2 is 8 marks)