Question 9 **(6 marks)**

The Cartesian equation of a sphere is given as $x^2 + y^2 + z^2 - 4x + 2y - 6z + 5 = 0.$

(a) Write the equation of the sphere in vector form. (3 marks)

A line has vector equation $\underset{\sim}{r} = \begin{pmatrix} 7 \\ -1 \\ 9 \end{pmatrix} + \lambda \begin{pmatrix} 3 \\ -1 \\ 4 \end{pmatrix}$.

(b) Determine the point(s) of intersection between the line and the sphere. (3 marks)