2017 Q5

5. (a) (i) Use Gaussian elimination on the system of equations below to give an expression for $z$ in terms of $\lambda$.

\[
\begin{align*}
    x + 2y - z &= -3 \\
    4x - 2y + 3z &= 11 \\
    3x + y + 2\lambda z &= 8
\end{align*}
\]

(ii) For what value of $\lambda$ is this system of equations inconsistent?

(b) Determine the solution of this system when $\lambda = -2.5$.

Answers

(a) (i) $z = \frac{11}{4\lambda - 1}$  (ii) $\lambda = \frac{1}{4}$

(b) $z = -1, \; y = -3, \; x = 2$