Tutorial 11

Question 1.

Find all real solutions to the following systems of equations.

(a)
$$\begin{aligned} 2x &+& 3y &+& 4z &=& 14 \\ 3x &+& 6y &-& z &=& 8 \end{aligned}$$

(b)
$$\begin{aligned} && 3y &+& z &=& 5 \\ 3x &+& 7y &-& 5z &=& 11 \\ 2x &-& y &+& 3z &=& 7 \end{aligned}$$

Question 2.

Suppose that
$$\begin{aligned} r &=& 2x &+& 3y \\ s &=& 3x &+& 6y \end{aligned}$$

where
$$\begin{aligned} x &=& & & 3v &+& w \\ y &=& 3u &+& 7v &-& 5w \end{aligned}$$

Express r and s in terms of u, v, w only.

Question 3.

Express $r + u, s + v$ and $t + w$ in terms of x, y and z, where

$$\begin{aligned} r &=& 2x &+& 3y &+& 4z \\ s &=& 3x &+& 6y &-& z \\ t &=& 2x &+& y &+& 6z \end{aligned}$$

and
$$\begin{aligned} u &=& & & 3y &+& z \\ v &=& 3x &+& 7y &-& 5z \\ w &=& 2x &-& y &+& 3z \end{aligned}$$

Question 4.

Find all real numbers λ for which there is a solution, other than $(x, y) = (0, 0)$, to the following system of equations.
$$\begin{aligned} 5x &-& 4y &=& \lambda x \\ 3x &-& 2y &=& \lambda y \end{aligned}$$

Find all solutions (x, y) for these values of λ.