# Advanced Higher Homework 10

1.  Solve the following systems of equations using Gaussian Elimination.

    (a)  $\begin{aligned} x + y + z &= 3 \\ 2x + 3y + 7z &= 0 \\ x + 3y - 2z &= 17 \end{aligned}$   (b)  $\begin{aligned} x + 2y + z &= 20 \\ 2x + y - 4z &= 7 \\ 3x - y + 2z &= 22 \end{aligned}$

2.  (a) Express this 3 x 3 system of equations as:

    (i)  a matrix equation (in the form $A\mathbf{x} = \mathbf{b}$)
    (ii) in augmented matrix form

    $$2x + y + z = 2$$
    $$3x + 2y - z = 6$$
    $$x - y \quad = 0$$

    (b) Reduce the matrix to upper triangular form.
    (c) Solve the system with the aid of back-substitution

3.  Under what conditions does the system of equations

    $$2x + y + z = 1$$
    $$x + 2y + 2z = 1$$
    $$3x + y + pz = q$$

    (a) have no solution
    (b) have infinitely many solutions