

**Term Test Ba version 2**

(1) [5 points]

(2) [5 points]

(3) [5 points] Solve the following system of linear equations.

$$\begin{array}{rrcrcl} 4x & - & y & + & 2z & = & -8 \\ -2x & + & 3y & + & 7z & = & 17 \\ 8x & + & 3y & + & 20z & = & 10 \end{array}$$

If the system is consistent and dependent, provide your answer in the form

$$S = \{u \in \mathbb{R}^3 \mid u \text{ corresponds to } \vec{u} = \vec{v}_0 + s_1 \vec{v}_1 + \dots + s_n \vec{v}_n\}$$

where  $n$  is the dimension of the solution space and  $s_i \in \mathbb{R}$  for  $i = 1, \dots, n$ . Note that  $(-2, 2, 1)^\top$  solves the system.

(4) [5 points] Consider the following three vectors in  $\mathbb{R}^3$ ,

$$\begin{pmatrix} -8 \\ -10 \\ 2 \end{pmatrix}, \begin{pmatrix} 0 \\ -1 \\ -3 \end{pmatrix}, \begin{pmatrix} -2 \\ 6 \\ 5 \end{pmatrix} \tag{1}$$

Determine the three lengths of these vectors and the three angles between them. If they replace the origin to the points  $P, Q, R$ , determine the plane equation for the plane containing the three points, using the cross product.