

**Term Test Ba version 1**

(1) [5 points]

(2) [5 points]

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

$$\begin{pmatrix} -7 \\ -2 \\ 3 \end{pmatrix}, \begin{pmatrix} -6 \\ -10 \\ -2 \end{pmatrix}, \begin{pmatrix} 10 \\ -3 \\ 7 \end{pmatrix} \quad (1)$$

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.

(4) [5 points] Solve the following system of linear equations.

$$\begin{array}{rrrrrr} 2a & - & 6b & - & 3c & = & 13 \\ -5a & - & 3b & + & c & = & 15 \\ 19a & - & 3b & - & 9c & = & -19 \end{array}$$

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  $(-1, -3, 1)^\top$  solves the system.