HW #1

To receive full credit, you must provide a detailed explanation of how you arrived at your answers.

Question 1.

(1) Let P be the point $(x, y) = (\sqrt{3}, -3)$, given in rectangular coordinates (in 2D). Find the polar coordinates of the point P.
(2) Let Q be the point $(x, y, z) = (-1, -1, -\sqrt{6})$, given in rectangular coordinates (in 3D). Find the spherical coordinates of the point R.

Question 2. Find the values of s, t such that

$$\vec{u} + \vec{v} = \vec{0}$$

holds, provided that the vectors $\vec{u}$ and $\vec{v}$ are given by

$$\vec{u} = \langle t^2 - 2s + t, s - t - 1 \rangle$$
$$\vec{v} = \langle t - t^2, s^3 + t - s \rangle$$

Question 3. For each of the following vectors, find the unit vector in the same direction.

(1) $\overrightarrow{AB}$, where $A = (4, 1, 2)$ and $B = (3, 2, 0)$.
(2) $\vec{u} + \vec{i} - 2\vec{j} - 3\vec{v}$, where $\vec{u} = \langle -3, -2, -1 \rangle$ and $\vec{v} = \langle -1, -1, 0 \rangle$.