Qudratic Surfaces and Tangents

Question 1:

Given a plane P with equation $2x-5y+7z=9$, and a line with the parametric form $L: \begin{cases} x(t) = & 1+4t \\ y(t) = & 2-kt \\ z(t) = & 1+6t \end{cases}$, find a value of k such that L is parallel to P.

Question 2:

Identify the quadratic surface, and find the point on which it is centered:

$$-x^2-4y^2-4z^2-2x+24z=33$$

Question 3:

Identify the quadratic surface, and find the point on which it is centered:

$$-9x^2+9y^2-z^2+72x+2z=136$$

Question 4:

Identify the quadratic surface, and find the point on which it is centered:

$$-y^2-4z^2+4x+2y-24z=41$$

Question 5:

The two curves C_1 and C_2 defined by:

$$C_1: y=x^3-9x^2+24x-15$$

and

$$C_2: y=x^3-6x^2+6x+9$$

intersect at the point $P(2,5)$.

part 5a:

Derive parametric equations for the tangent lines to C_1 and C_2 at the intersection point P.

part 5b:

Derive the angle between the tangent lines from the previous section.