1. a) Find parametric equations for the line through the points \( P(1,2,3) \) and \( Q(-1,5,2) \).

b) Find the distance from the point \( R(2,3,4) \) to the line in part a.

2. a) The points \( P, Q \) and \( R \) from #1 are three vertices of a parallelogram. Find the fourth vertex and the area of this parallelogram.

b) Find an equation of the plane through \( P, Q \) and \( R \).

3. Find spherical and cylindrical coordinates for the point with rectangular coordinates \((\sqrt{6}, \sqrt{6}, 2)\).

4. Describe the traces of the surface given by \( x^2 + y^2 - 2z^2 = 0 \) in the planes \( x = k, \ y = k \) and \( z = k \). Use these traces to help sketch this surface.

5. Find an equation for the tangent line to the parametric curve \( x = \sin(2t), \ y = e^t \) at the point \( (0,1) \).

6. a) Plot at least 12 points by hand and accurately sketch the polar curve \( r = 2\sin(3\theta) \).

b) Compute the area in one “petal” of the curve in part a.