1. Graph the ellipse $4x^2 + 9y^2 = 36$. Label vertices and foci.

2. Find an equation for the tangent line to the curve given parametrically by $x = t^3 - e^t$, $y = \ln t + t$ at the point where $t = 2$.

3. Find the area of the triangle with vertices $P(1, 2, 3)$, $Q(2, 3, 1)$ and $R(3, 1, 2)$. 
4. Set up, but do not evaluate, an integral to compute the arclength of one leaf of the rose $r = 2\sin(2\theta)$. Include a sketch of the curve.

5. Describe the surface given by the equation $r = z$ in cylindrical coordinates.

6. Find the distance from the point $P(1, 2, 3)$ to the plane given by $x - 3y + 7z = 4$. 