

Calculus with Analytic Geometry III

1. Find the center and the radius of $x^2 + y^2 = 6x - 10y + 3$
2. Sketch the following graphs, identifying any foci, asymptotes, directrices, etc...
 - a) $4x^2 - y^2 = 1$
 - b) $4x + 3y^2 = 7$
 - c) $\frac{(x-2)^2}{9} + \frac{y^2}{2} = 1$
3. Let $\mathbf{R}(t) = e^t \mathbf{i} + e^t(\sin t + \cos t) \mathbf{j} + e^t(\sin t - \cos t) \mathbf{j}$ give the position of a moving particle at time t .
 - a) Find the velocity vector of the particle at time t .
 - b) Find the speed of the particle at time t .
 - c) Find the acceleration of the particle at time t .
 - d) Find the vectors \mathbf{T} , \mathbf{N} , \mathbf{B} at time t .
 - e) Find the distance traveled by the particle from time $t = 0$ to time $t = 2$.
 - f) Find the curvature of the path at time $t = \pi/4$.