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(1.) $x = \cos t + \sin t$

$y = \sin t + t\cos t$

$\frac{dx}{dt} = -\sin t + \sin t + t\cos t$

$\frac{dx}{dt} = t\cos t$

$\frac{dt}{dx} = \frac{1}{t\cos t}$

$\frac{dy}{dt} = \cos t - \cos t + t\sin t$

$\frac{dy}{dt} = t\sin t$

$\frac{dy}{dx} = \frac{dy}{dt}\frac{dt}{dx} \Rightarrow t\sin t \times 1/t\cos t$

$\frac{dy}{dx} \tan t$

$\frac{dy}{dx} = \tan t$

$\frac{d^2y}{dx^2} = \sec^2 t \frac{dt}{dx}$

$\frac{d^2y}{dx^2} = \sec^2 t \times \frac{1}{t\cos t} = \frac{\sec^2 t}{t\cos t}$

Radius of curvature $= \left\{\frac{1 + (dy/dx)^2}{d^2y/dx^2}\right\}^{3/2}$

$$R = \left[\frac{1 + \tan^2 t}{\sec^2 t / t\cos t}\right]^{3/2}$$

$$R = \frac{(\sec^2 t)^{3/2}}{\sec^2 t / t\cos t}$$

$$R = \sec^3 t \times \frac{t\cos t}{\sec^2 t}$$

$$= \sec t \times t\cos t$$

$$= \frac{1}{\cos t} \times t\cos t$$

$$R = t_{\prime\prime}$$

(a) $h = x_0 - R\sin t$

$k = y_0 + R\cos t$

$h = \cos t \; t \; t\sin t - t\sin t$

$h = \cos t$

$k = \sin t - t\cos t \; t \; t\cos t$

$k = \sin t$

$\therefore$ Coordinate $(\cos t, \sin t)$