$$x = a(\cos t + t\sin t)$$

$$y = a(\sin t - t\cos t)$$

$$r = \sqrt{x^2 + y^2}$$

$$\theta = \tan^{-1} \frac{y}{x}$$

$$\tan\theta = \frac{y}{x} = \frac{\cancel{a}(\cos t + t\sin t)}{\cancel{a}(\sin t - t\cos t)}$$

$$\tan\theta = \frac{\cos t + t\sin t}{\sin t - t\cos t} \qquad \tan = \frac{\sin}{\cos}$$

$$\tan\theta = \frac{\cos t + t\cos t\tan t}{\cos t\tan t - t\cos t}$$

$$\tan\theta = \frac{\cancel{\cos t}(1 + t\tan t)}{\cancel{\cos t}(\tan t - t)}$$

$$\tan\theta = \frac{1 + t\tan t}{\tan t - t}$$