

Quiz 1 201

Q1. Let $r = \cos(3\theta)$. (1) Draw a sketch of $r(\theta)$ showing points of interest on the curve.

(2) Find the equation of the tangent line at $\theta = \pi/4$.

Q2. (1) Find the length of the curve, ~~$x = e^t + e^{-t}$~~
 $x = e^t + e^{-t}$, $y = 5 - 2t$, $0 \leq t \leq 3$.

(2) Find the area enclosed by the x -axis and the curve $x = 1 + e^t$, $y = t - t^2$.

Q3. (1) Find the common (overlapping) area between the curve $r = \frac{1}{2}$ and one leaf of $r = \cos(3\theta)$.

(2) Write down the integral for the length of the boundary of one leaf of the curve $r = \cos 3\theta$.
(But do not evaluate the integral.)