

$dx/dt = 18t$ and $dy/dt = 18t^2$, so

$$(dx/dt)^2 + (dy/dt)^2 = 324t^2 + 324t^4.$$

$$\begin{aligned} \text{Thus, } L &= \int_0^3 \sqrt{324t^2 + 324t^4} dt = \int_0^3 18t\sqrt{1+t^2} dt \\ &= 18 \int_1^{10} \sqrt{u} \left(\frac{1}{2} du\right) \quad [u = 1+t^2, du = 2t dt] \\ &= 9 \left[\frac{2}{3} u^{3/2}\right]_1^{10} = 6((10)^{3/2} - 1) = 6(10\sqrt{10} - 1) \end{aligned}$$