

Ex. 1 (Noncalculator)

Given the parametric equations $x = 2\sqrt{t}$ and $y = 3t^2 - 2t$, find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$.

Ex. 2 (Noncalculator)

Given the parametric equations $x = 4\cos t$ and $y = 3\sin t$, write an equation of the tangent line to the curve at the point where $t = \frac{3\pi}{4}$.

Ex. 3 (Noncalculator)

Find all points of horizontal and vertical tangency given the parametric equations

$$x = t^2 + t, \quad y = t^2 - 3t + 5.$$

Ex. 4 (Noncalculator)

Set up an integral expression for the arc length of the curve given by the parametric equations $x = t^2 + 1$, $y = 4t^3 - 1$, $0 \leq t \leq 1$. Do not evaluate.