

Quiz 9

Name: Solution key

Answer all questions in a clear and concise manner. Unsupported answers will receive *no credit*.

1. Consider the parametric curve $x = e^t$, $y = t^2 + 2t + 1$.

(a) Find a Cartesian equation for the curve.

$$\begin{array}{l}
 t = \ln(x) \\
 y = (\ln(x))^2 + 2\ln(x) + 1
 \end{array}
 \quad \left| \quad \begin{array}{l}
 y = (t+1)^2 \\
 y = t^2 + 2t + 1 \\
 t = \ln(x)
 \end{array}
 \right.$$

(b) Compute the slope of a tangent line to the curve at $t = 0$.

$$\frac{dy}{dt} = 2t + 2 \quad \left| \quad \frac{dx}{dt} = e^t
 \right.$$

$$\frac{dy}{dx} = \frac{2t+2}{e^t} \quad \text{At } t=0: \quad \frac{dy}{dx} = \frac{2}{e^0} = 2$$