

**Quiz Five**

Show all of your work, and justify your answers. Answers without work or justification will not receive full credit. You may not use notes or calculators on any part of the quiz.

(5 points) Find the arclength of the parametric equation

$$\begin{aligned}x(t) &= \ln(t^2) - \frac{t^2}{4} \\y(t) &= 2t + 9.\end{aligned}$$

as t ranges from $t = 1$ to $t = 4$.

(5 points) Find the equation of the tangent line to the function

$$\vec{r}(t) = \langle \cos^2 t, \ln(1 - t), t^2 + 1 \rangle$$

at the point $t = 0$.