

HW Sec 10.2

Please use your own paper.

(ANSWER KEY online)

(Perform reality check for each step with Desmos/WolframAlpha and verify your final answers with the provided answer key).

- Consider the parametric curve $\Gamma : \begin{cases} x = 2t^2 - 5 \\ y = t^3 + t \end{cases}$, $-\infty < t < \infty$. Where does Γ have a tangent line that is perpendicular to the line $x + y + 3 = 0$?
- Consider the parametric curve $\Gamma : \begin{cases} x = \cos(t) \\ y = \cos(3t) \end{cases}$, $0 \leq t \leq \pi$. Find the points on Γ where the tangent line is horizontal or vertical.
- Consider the parametric curve $\Gamma : \begin{cases} x = \ln(\sin t) \\ y = t \end{cases}$, $\frac{\pi}{6} \leq t \leq \frac{\pi}{2}$. Find the arc length of Γ .
- Consider the parametric curve $\Gamma : \begin{cases} x = 1 + e^t \\ y = t - t^2 \end{cases}$, $-\infty < t < \infty$. Find the area enclosed by the curve and the x -axis.
- Consider the parametric curve $\Gamma : \begin{cases} x = 2 \cos^3 \theta \\ y = 2 \sin^3 \theta \end{cases}$, $0 \leq \theta \leq \frac{\pi}{2}$.
 - Find the points on Γ where the tangent line is horizontal or vertical.
 - Find the arc length of Γ .
 - (Optional) Find the area of the surface obtained by rotating Γ about the x -axis.
- (Optional) Consider the parametric curve $\Gamma : \begin{cases} x = 3t - t^3 \\ y = 3t^2 \end{cases}$, $0 \leq t \leq 1$. Find the area of the surface obtained by rotating Γ about the x -axis.
- (Optional) Consider the parametric curve $\Gamma : \begin{cases} x = e^t - t \\ y = 4e^{\frac{t}{2}} \end{cases}$, $0 \leq t \leq 1$. Find the area of the surface obtained by rotating Γ about the y -axis.