Math 199 CD3 Merit Worksheet 9: Arc Length

February 22, 2022

1 Arclength

1. Find the arc length of $\frac{1}{3}\sqrt{x}(3-x)$ for $0 \leq x \leq 3$

2. Find the arc length of $\frac{2}{3}(1+x^2)^{3/2}$ for $0 \leq x \leq 3$

3. Find the arc length of the curve $y = \frac{a}{2}(e^{x/a} + e^{-x/a})$ from $x = 0$ to $x = b$.

4. Find the arc length of the curve $x = e^t \cos t$, $y = e^t \sin t$, from $t = 0$ to $t = \pi$. This is hard, you might need to understand the idea of parametrization

2 Surface Area

5. Derive the surface area formula for a sphere of radius r

6. $y = x^2$ around x-axis, $0 \leq x \leq \frac{1}{2}$

7. $y = \frac{x^4}{4} + \frac{1}{8x^2}$ for $1 \leq x \leq 2$ about the y-axis

8. $y^2 + 4x = 2\ln y$, $0 \leq y \leq 3$; about the x-axis

9. $y = \frac{x^3}{6} + \frac{1}{2x}$, $1 \leq x \leq 2$ about the y-axis