

Section 6.3: Arc Length - Worksheet

1. Calculate the arc length of the given curves.

(a) $y = 11 - 2(x - 5)^{3/2}$, $5 \leq x \leq 6$.

(b) $x = \frac{1}{4}\sqrt[3]{y} - \frac{9}{5}\sqrt[3]{y^5}$, $1 \leq y \leq 2$.

(c) $x = \sqrt{16y - y^2}$, $4 \leq y \leq 12$.

(d) $y = \frac{1}{6} \ln(\sin(3x) \cos(3x))$, $\frac{\pi}{18} \leq x \leq \frac{\pi}{9}$.

(e) $y = \frac{e^{5x} + e^{-5x}}{10}$, $0 \leq x \leq \frac{1}{5}$.

(f) $x = \frac{4}{5}y^{5/4}$, $0 \leq y \leq 9$.

2. Find a curve of the form $y = f(x)$ passing through $(4, 13)$, having negative derivative, and whose length integral on $1 \leq x \leq 7$ is given by

$$L = \int_1^7 \sqrt{1 + \frac{25}{x^3}} dx.$$