

Learning outcomes

After completing this section, you will inshaAllah be able to

1. find **arc length** of curves given in
 - a. **rectangular coordinates**

Formulas for finding arc length
(rectangular coordinates)

Given $y = f(x)$.

The arc length of graph of $y = f(x)$ from the point $P_1(a, f(a))$ to $P_2(b, f(b))$ is

$$L = \int_a^b \sqrt{1 + [f'(x)]^2} dx$$

See class explanation about derivation of formula

See example 1 done in class

Given $x = g(y)$.

The arc length of graph of $x = g(y)$ from the point $P_1(g(c), c)$ to $P_2(g(d), d)$ is

$$L = \int_c^d \sqrt{1 + [g'(y)]^2} dy$$

Derivation of formula similar to above

See example 2 done in class

See **important (clever) trick** used in doing integration in Example 2

End of Section 8.1