MAC2312: Calculus 2 - Section 3

Quiz 7: 8.1 Arc Length

June 11, 2015

1. Set up an integral that represents the length of the curve $y = \sin x$ from $x = 0$ to $x = \pi$.

   A. $\displaystyle\int_0^\pi \sqrt{1 + \sin^2 x}\, dx$

   B. $\displaystyle\int_0^\pi \sqrt{1 - \sin^2 x}\, dx$

   C. $\displaystyle\int_0^\pi \sqrt{1 + \cos^2 x}\, dx$

   D. $\displaystyle\int_0^\pi \sqrt{1 - \cos^2 x}\, dx$

$$y = \sin x$$
$$\frac{dy}{dx} = \cos x$$

so the length along the curve $y = \sin x$ from $x = 0$ to $x = \pi$ is

$$L = \int_a^b \sqrt{1 + \left(\frac{dy}{dx}\right)^2}\, dx$$
$$= \int_0^\pi \sqrt{1 + \cos^2 x}\, dx$$