Math 152 Calculus and Analytic Geometry II

Sec. 8.1 Arc Length

How do you calculate the length of a curve. Divide it into many segments and approximate each one by a straight line. Use the distance formula on each straight line.

We can derive a nice integral formula for this as long as the function has a continuous derivative.

If a function does not have a continuous derivative, we can't use this formula

http://www.shodor.org/interactivate/activities/kochsnowflake/

Suppose we have a curve y=f(x) on an interval from a to b.

Divide it into segments, how long is the segment with width dx?

So what is the integral for the total length?

Find the length of the curve $y = \frac{2}{3}\left(x^2 - 1\right)^{\frac{3}{2}}$ between x=1 and x=3

Draw it and estimate the length before you start.

Find the length of the curve $y^2 = x^3$ from (1,1) to (4,8).

Sec. 8.2 Surface Area (Quickly)

$$SA = \int_a^b 2\pi(f(x))\sqrt{1+\left(f'(x)\right)^2}\,dx$$

$$SA = 2\pi(radius)(diagonal-lentgh)$$

Rotate y=1/x around the x-axis from x=1 to infinity.

Find Volume.

Find Surface Area.

http://www.calculusapplets.com/revolution.html