

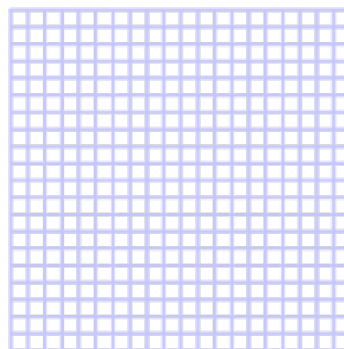
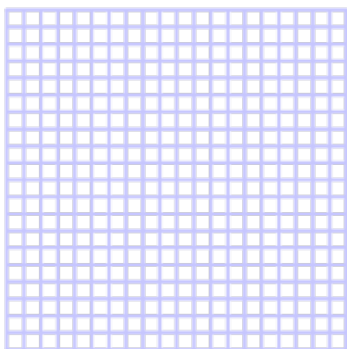
Math 152 Calculus and Analytic Geometry II

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 $y = \frac{2}{3}(x^2 - 1)^{\frac{3}{2}}$ 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)

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

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

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

Find Volume.

Find Surface Area.

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