Calculus with Parametric Equations

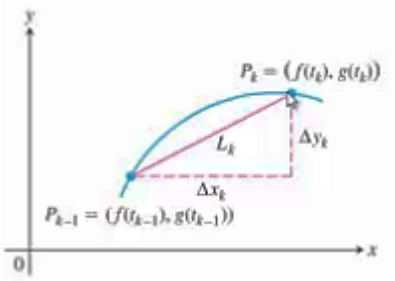
Parametric Equations

2 functions that have continuous derivatives on $[a,b]$ that are not simultaneously zero are said to be

$$\frac{d}{dx}\left(\frac{dy}{dx}\right)=$$

Tangent to a curve

$x=\sin t \qquad y=\cos t \qquad \text{at } t=\frac{\pi}{3}$

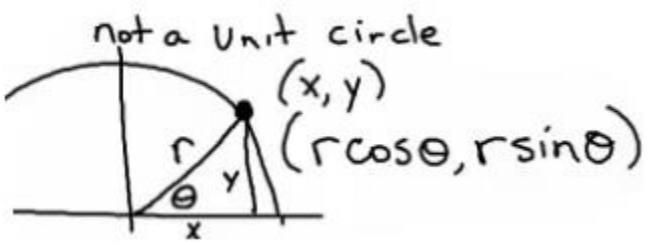


Length of a curve

Assuming the path is only traveled once as t increases from a to b then

Arc length

Example for circumference of a circle



Area of Surface of Revolution for Parametrized Curves

If a smooth curve $x = f(t), y = g(t), a \leq t \leq b$, is traversed exactly once as t increases from a to b, then the areas of the surfaces generated by revolving the curve about the coordinate axes are as follows.

1. Revolution about the x-axis ($y \geq 0$):

2. Revolution about the y-axis ($x \geq 0$):