% the parameter interval that gives the complete curve

%t=linspace(0,4\*pi,1000);% -0=<t=<4pi included b/c the period is 4 pi

% the approximate length of this curve

syms t

L= (sqrt(diff(x(t)).^2+diff(y(t)).^2))

LL=vectorize(L)

answer=quad(LL,0,4\*pi)

% rotate the curve about the y- axis and the area of the outer surface that is generated

syms t

SA= 2\*pi\*x(t)\*(sqrt(diff(x(t)).^2+diff(y(t)).^2))

SA=vectorize(SA)

I=quad(SA,0,4\*pi)

double(I)