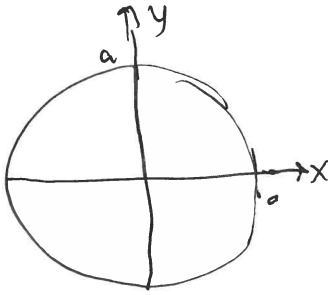
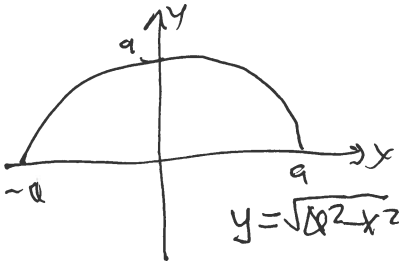
10.1 2d parametrized curves



$x^2+y^2=a^2$



curves defined by graphs or equations

↓

parametrize?

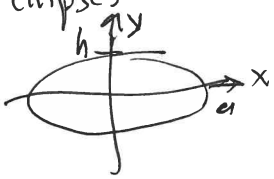
$\left(\frac{x}{a}\right)^2+\left(\frac{y}{b}\right)^2=1$

$\cos^2 t \quad \sin^2 t$

↳ $\frac{x}{a}=\cos t \rightarrow x=a\cos t$

$\frac{y}{a}=\sin t \quad y=a\sin t$

generalize to ellipses



$\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$

$x=a\cos t$

$y=b\sin t$

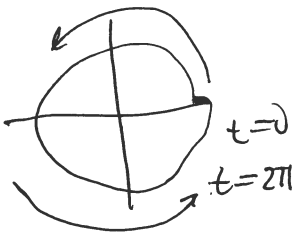
$\theta=t$

$x=a\cos\theta=a\cos t$

$y=a\sin\theta=a\sin t$

$t=0..2\pi$

[flip $t\rightarrow -t$ to go opposite direction]

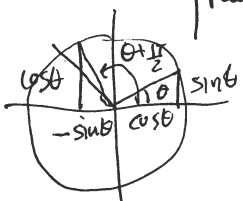


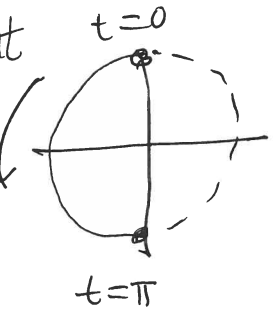
$x=a\cos(t+\frac{\pi}{2})=-a\sin t$

$y=a\sin(t+\frac{\pi}{2})=a\cos t$

$t=0..\pi$

trig identities





parametrized curves trace out curves (paths) in a particular way.

eliminate parameter either by using identities or solving one equation for parameter and back-subing into other equation

$x^2+y^2=(a\cos t)^2+(a\sin t)^2$

$=a^2\cos^2 t+a^2\sin^2 t=a^2(\cos^2 t+\sin^2 t)$

$=a^2$ ✓

EX. $x=t^2$

$y=2t \rightarrow t=\frac{y}{2}$

$=\left(\frac{y}{2}\right)^2=\frac{1}{2}y^2$

x = function of y graph with y as ind var.