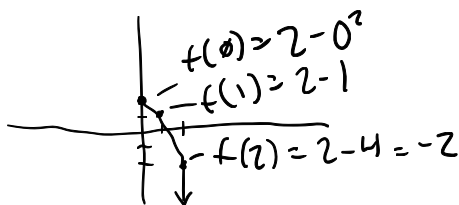


## Sections 10.1 and 10.2

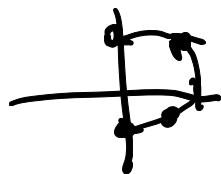
1. Consider the following parametric equations. Sketch the curve by plotting points. Also, eliminate the parameter to find a Cartesian equation of the curve.

a)  $x = \sqrt{t}$ ,  $y = 2 - t$ , for  $t \geq 0$



$t = x^2$      $-t = y - 2$ ,  $t = 2 - y$   
 $2 - y = x^2$      $-y = x^2 - 2$      $y = 2 - x^2$   
 looks like a negative parabola  
 for  $x \text{ vds } \geq 0$

b)  $x = \cos(\frac{\theta}{2})$ ,  $y = \sin(\frac{\theta}{2})$ ,  $-\pi \leq \theta \leq \pi$

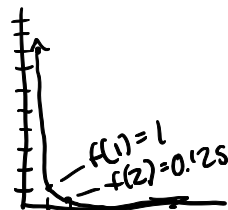


since  $\cos^2(a) + \sin^2(a) = 1$   
 Unit circle pythag thing  
 and  $a = \theta/2$ ,  $x^2 + y^2 = 1$

c)  $x = e^t$ ,  $y = e^{-3t}$

$\ln x = t$      $\ln y = -3t$      $\ln x = \frac{-\ln y}{3}$   
 $-\frac{\ln y}{3} = t$      $-3 \ln x = \ln y$      $f(x) = e^{\ln(x^{-3})}$   
 $\ln x^3 = \ln y$      $f(x) = \frac{1}{x^3}$

$f(0.5) = 8$



2. Consider the following parametric equations. Find the points on the curve where the tangent is horizontal or vertical.

$x = t^3 - 3t$ ,  $y = t^2 - 3$

$\frac{\partial x}{\partial t} = 0$  or  $\frac{\partial y}{\partial t} = 0$

$\frac{\partial x}{\partial t} = (3t^2 - 3)$

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

no change in  $y$  is horizontal

$0 = 2t$

horizontal only at  $t = 0$

$0 = 3t^2 - 3$

$0 = 3(t^2 - 1)$

$0 = 3(t+1)(t-1)$

horizontal at

$t = -1, 1$

$(2, -2), (-2, -2)$

$(0, -3)$