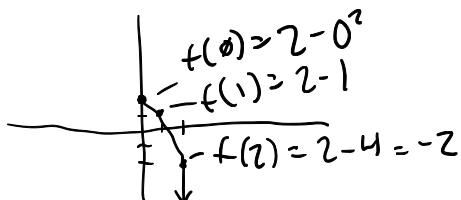


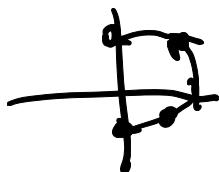
Sections 10.1 and 10.2

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

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



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



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

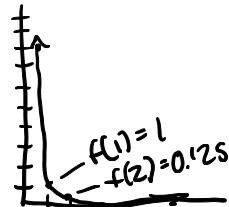
$$\ln x + \ln y = -3t \quad \ln x = -\frac{1}{3} \ln y$$

$$-\frac{1}{3} \ln y = t \quad -3 \ln x = \ln y$$

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

$$\ln x^3 = \ln y \quad f(x) = \frac{1}{x^3}$$

$$f(0.5) = 8$$



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

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

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

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

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

no change in
y is horizontal

$$t = 0$$

horizontal only at
 $t = 0$

$$\theta = 3t^2 - 3$$

$$\theta = 3(t^2 - 1)$$

$$\theta = 3(t+1)(t-1)$$

horizontal at

$$(t = -1, 1) \quad (2, -2), (-2, -2)$$

$$(0, -3)$$