6.3 Parametric Equations

A parametric curve consists of the set of points (x, y) where $x = f(t)$ & $y = g(t)$ defined over the interval I of t-values.

$f(t)$ & $g(t)$ are the parametric eqns
t is the parameter
I is the parameter's interval.

Ex #1 Graph the parametric curve

$x = t^2 - 2$

$y = 3t$

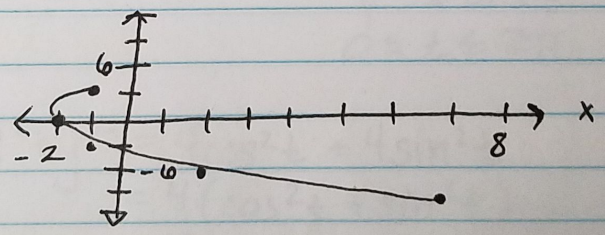
over the interval (a) $-3 \le t \le 1$

(b) $-2 \le t \le 3$,

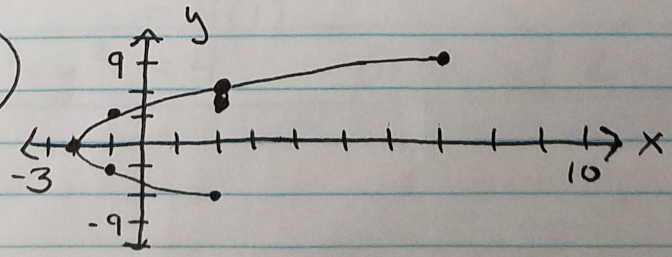
by using a t-x-y chart.

t	-3	-2	-1	0	1	2	3
x	7	2	-1	-2	-1	2	7
y	-9	-6	-3	0	3	6	9

a)



b)



Ex #2 Eliminate the parameter to obtain a rectangular equation for

$x = 1 - 2t$

$y = 2 - t$

$t \in \mathbb{R}$.

$x = 1 - 2t$

$t = -\frac{x-1}{2}$

$y = 2 + \frac{x-1}{2}$

$y = 2 + \frac{x}{2} - \frac{1}{2}$

$\boxed{y = \frac{x}{2} + \frac{3}{2}}$ linear

Ex #3 Do as ex #2 w/ $x = t^2 - 2$

$y = 3t$.

$x = t^2 - 2$

$t = \pm\sqrt{x+2}$

$\boxed{y = \pm 3\sqrt{x+2}}$

$y^2 = 9(x+2)$

conic section: sideways parabola

Ex #4 Do ex #2 w/ $x = 2\cos t$

$y = 2\sin t$

$0 \leq t \leq 2\pi$.

$x^2 + y^2 = 4\cos^2 t + 4\sin^2 t$

$= 4(\cos^2 t + \sin^2 t)$

$= 4(1)$

$\boxed{x^2 + y^2 = 4}$ circle w/ $R = 2$