

$$\begin{cases} x = t - 3 \\ y = 2t + 4 \end{cases}$$

$$y = 2x + 10$$

Eliminating parameter t

$x = t - 3 \Rightarrow t = x + 3$
 $y = 2(x + 3) + 4$
 $y = 2x + 6 + 4 = 2x + 10$

$$\begin{cases} x = t^3 + 2t - 1 \\ y = \frac{t}{2t^3 + 1} \end{cases}$$

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Eliminating Parameter

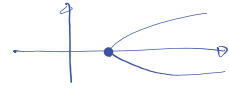
Given the pair of parametric equations, eliminate t to obtain an equation in x and y (Cartesian equation)

E.g. $\begin{cases} x = 2t + 1 \\ y = 3\sqrt{t} \end{cases}$

$t = \frac{x-1}{2}$
 $y = 3\sqrt{\frac{x-1}{2}}$

$y^2 = 9t$
 $t = \frac{y^2}{9}$

$x = 2 \cdot \frac{y^2}{9} + 1$
 $x = \frac{2y^2}{9} + 1$



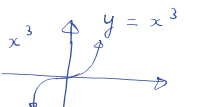
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E.g. $\begin{cases} x = 2e^t \\ y = 1 - 5t \end{cases}$

$x = 2e^t \Rightarrow \frac{x}{2} = e^t \Rightarrow \ln\left(\frac{x}{2}\right) = \ln(e^t)$
 $t = \ln\left(\frac{x}{2}\right)$

$y = 1 - 5 \cdot \ln\left(\frac{x}{2}\right)$

E.g. $\begin{cases} x = e^{2t} \\ y = e^{6t} \end{cases} = (e^{2t})^3 = x^3$



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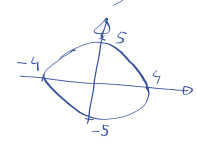
$\begin{cases} x = 4 \sin(t) \\ y = 5 \cos(t) \end{cases}$

$5x = 20 \sin(t)$
 $4y = 20 \cos(t)$

$25x^2 = 400 \sin^2 t$
 $16y^2 = 400 \cos^2 t$

$25x^2 + 16y^2 = 400 \sin^2 t + 400 \cos^2 t$
 $25x^2 + 16y^2 = 400(\sin^2 t + \cos^2 t)$
 $25x^2 + 16y^2 = 400$

$\frac{x^2}{16} + \frac{y^2}{25} = 1$



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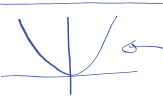
E.g. $\begin{cases} x = \cos t + 4 \\ y = 2 \sin^2 t \end{cases}$

$x - 4 = \cos t$
 $2(x - 4)^2 = 2 \cos^2 t$
 $y = 2 \sin^2 t$

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

$2(x - 4)^2 + y = 2$
 $y = 2 - 2(x - 4)^2$

$y = -x^2$



$\begin{cases} x = t \\ y = t^2 \end{cases}$

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$x^2 + y^2 = 1$

$\begin{cases} x = \sin t \\ y = \cos t \end{cases}$

$x^2 + y^2 = 4$

$x^2 + y^2 = R^2$

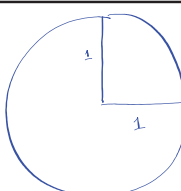
$\frac{x^2}{4} + \frac{y^2}{9} = 1$

$\begin{cases} x = 2 \sin t \\ y = 2 \cos t \end{cases}$

$\begin{cases} x = R \sin t \\ y = R \cos t \end{cases}$

$\begin{cases} x = a \sin t \\ y = b \cos t \end{cases}$

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



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