Eliminating the Parameter in Parametric Equations

To eliminate the parameter, we solve one equation for $t$ and use substitution to arrive at a single equation in terms of $x$ and $y$.

Ex 1: Eliminate the parameter in this system of equations from the previous lecture.

\[
\begin{align*}
x &= 2t + 1 \\
y &= t^2 - 2
\end{align*}
\]
If the parametric equations have trigonometric expressions, using one of the Pythagorean Identities might be useful.

Ex 2: Eliminate the parameter in this set of equations and sketch the curve.

\[
\begin{align*}
  x &= 2 \cos t \\
  y &= 1 + 3 \sin t
\end{align*}
\]

\[
0 \leq t \leq \frac{3\pi}{2}
\]

Ex 3: Find a parameterization for each of these equations and sketch each one.

a) \(3x - y^2 = 2\) from \(x = -2\) to \(x = 3\)  
   b) \(x^2 - 2x + y^2 + 4y = 4\)