1 1.3: Vector Functions and Parametrized Curves

Definitions:
(Recall) function:

Vector Valued function:

Parametrized Curve:

Eliminating the Parameter

Vector and Parametric Equations of a Line
Examples:

Given \( r(t) = \sin t \mathbf{i} + \cos^2 t \mathbf{j} \), eliminate the parameter to find the Cartesian equation of the curve. Is the point \((2, -3)\) on the curve?

\[
r(t) = \langle 2 \sin t, 3 \cos t, \rangle, \quad 0 \leq t \leq 2\pi.
\]

Describe the motion of a particle with position \( r(t) = \langle 2 \sin t, 3 \cos t \rangle, \quad 0 \leq t \leq 2\pi. \)

Find vector and parametric equations for the line passing through the points \((-3, 4)\) and \((2, 8)\).
On Your Own: Given the curve parametrized by $\mathbf{r}(t) = (t^2 + 1)i + (t^2 - 1)j$, determine when, if at all, the curve passes through the point $(5, 3)$

$t = 2, t = -2$