1 3.7: Derivatives of Vector Functions

Recall definition:

What the derivative of a vector function tells us:

Examples:

Find the velocity and speed if the position function is given by \( \mathbf{r}(t) = (5 \cos t)i + (5 \sin t)j \) at the point \((-3, 4)\).
Find a unit tangent vector for the curve $\mathbf{r}(t) = \langle t \cos t, t \sin(2t) \rangle$ at the point where $t = \pi$.

(On your own): Find parametric equations of the line tangent to the curve $\mathbf{r}(t) = (t^3 - t + 1)i + (t^2 + t + 1)j$ at the point where $t = 1$.

$(x = 1 + 2t, y = 3 + 3t)$