3.7-Derivatives of Vector Functions

Recall definition:

What the derivative of a vector function tells us:

Acceleration vector:

*Examples:*

Find the velocity, speed, and acceleration for the curve \( \mathbf{r}(t) = < 4\sin t, 4\cos t > \) at the point \((2, -2\sqrt{3})\).
Find a unit tangent vector for the curve $\mathbf{r}(t) = \langle t \cos 2t, t \sin 2t \rangle$ at the point where $t = \pi$.

The graphs of $\mathbf{r}(t) = t^2 \mathbf{i} + t^3 \mathbf{j}$ and $\mathbf{r}(t) = \langle \sqrt{2} \cos t, \sqrt{2} \sin t \rangle$ intersect at the point (1,1). Find the angle of intersection to the nearest degree.

**On Your Own:** 3.7 #2,3,7,8,10,12,14,16,18,19; 3.8 #41,44,46,48,51,52 (more to come...)