

4. (3 points) If f is a vector-valued function defined by $f(t) = \langle 2 \sin t, \cos 2t \rangle$, then what is $f''(\pi/3)$?

5. (3 points) Find the vector-valued function $f(t)$ that satisfies the initial conditions $f(1) = \langle 4, 5 \rangle$, and $f'(t) = \langle 6t, 7 \rangle$.

6. (4 points) (Calculator-active) At time $t \geq 0$, a particle moving in the xy -plane has velocity vector given by $v(t) = \langle \sin(t^2), 2\sqrt{t} \rangle$. If the particle is at point $(-3, 1)$ at time $t = 0$, how far is the particle from the origin at time $t = 3$?