# Worksheet 5
## Vector Valued Functions                                      MATH 2210, Fall 2018

1. Compute $f'(1)$, where $f(t) = \mathbf{u}(t) \cdot \mathbf{v}(t)$, $\mathbf{u}(1) = \langle 1, 2, -1 \rangle$, $\mathbf{u}'(1) = \langle 1, 2, -3 \rangle$, and $\mathbf{v}(t) = \langle t, t^2, t^3 \rangle$.

2. Given $\mathbf{r}(t) = 4\cos(t)\mathbf{i} + 4\sin(t)\mathbf{j}$ find the following

(a) $\mathbf{r}'(t)$

(b) $\mathbf{r}''(t)$

(c) $\mathbf{r}'(t) \cdot \mathbf{r}''(t)$

3. Evaluate $\displaystyle\int_0^1 (8t\mathbf{i} + t\mathbf{j} - \mathbf{k})\, dt$

4. The position function vector $\mathbf{r}(t) = t^2\mathbf{i} + t\mathbf{j} + 2t^{3/2}\mathbf{k}$ describes the path of an object moving in space. Find the velocity, speed, and acceleration of the object.