



FERPA RELEASE: Because of privacy concerns, we are not allowed to return your graded homework in lecture without your permission. If you wish us to return your homework in lecture, please sign on the line indicated below. Otherwise, you will have to pick your homework up in your instructor's office.

SIGN HERE: \_\_\_\_\_.

Problem	Points	Score
1	4	
2	4	
3	4	
Total	12	

1. (4) Compute the position vector for a particle which passes through the origin at time  $t = 0$  and has velocity vector

$$\mathbf{r}(t) = 2t \mathbf{i} + \sin t \mathbf{j} + \cos t \mathbf{k}.$$

2. (4) Consider the curve defined by

$$\mathbf{r}(t) = \langle 4 \sin ct, 3ct, 4 \cos ct \rangle.$$

What value of  $c$  makes the arc length of the space curve traced by  $\mathbf{r}(t)$ ,  $0 \leq t \leq 1$ , equal to 10?

3. (4) Show that if a particle moves at constant speed, then its velocity and acceleration vectors are orthogonal. (Hint: consider the derivative of  $\mathbf{v} \bullet \mathbf{v}$ .)