Math 126C   **First Midterm**   **Spring 2014**

Your Name

Your Signature

Student ID #

Section   10:30   11:30
(circle one)   CA   CB

Problem	Total Points	Score
1	8	
2	8	
3	9	
4	8	
5	8	
6	9	
Total	50	

- This exam is closed book. You may use one $8\frac{1}{2} \times 11$ sheet of notes.

- Graphing calculators are not allowed.

- Do not share notes.

- In order to receive credit, you must show your work. Explain why your answers are correct.

- **Place a box around** YOUR FINAL ANSWER **to each question.**

- If you need more room, use the backs of the pages and indicate to the reader that you have done so.

- Raise your hand if you have a question.

1 (8 points)   Let $\mathbf{r}(t) = t^2\,\mathbf{i} + t\sqrt{t-1}\,\mathbf{j} + t\sin\pi t\,\mathbf{k}$. Calculate the integral $\displaystyle\int_1^2 \mathbf{r}(t)\,dt$. Give your answer in exact form.

2 (8 points)   Consider the curve in $\mathbf{R}^2$ with parametric equations $x = 1 + t^2,\quad y = 3t - t^3$.

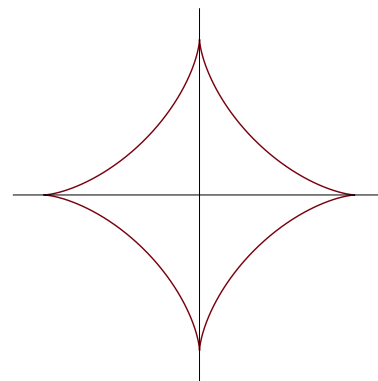For which values of t is the curve concave upward?

$\boxed{3}$ (9 points)   Compute the distance from the point $(2, 4, 3)$ to the line of intersection of the two planes $x + y = 2$ and $y + z = 3$.

4 (8 points)   Find an equation of the plane that passes through the origin and contains the line with symmetric equations $x - 1 = 2 - y = \dfrac{z + 1}{4}$.

5 (8 points)   Calculate the length of the curve

$$x = \cos^3 t, \ y = \sin^3 t$$

where $0 \le t \le 2\pi$.

6 (9 points)   At what point do the curves in $\mathbf{R}^3$ intersect?

$$\mathbf{r}_1(t) = \left\langle t - 1, 3t, t^2 \right\rangle \quad \text{and}$$

$$\mathbf{r}_2(t) = \left\langle t + 2, 1 - t, t^3 + 9 \right\rangle$$

Find their angle of intersection, correct to the nearest degree.