

Math 126 C - Autumn 2010  
Mid-Term Exam Number One  
October 26, 2010

Name: \_\_\_\_\_ Student ID no. : \_\_\_\_\_

Signature: \_\_\_\_\_ Section: \_\_\_\_\_

|       |    |  |
|-------|----|--|
| 1     | 10 |  |
| 2     | 10 |  |
| 3     | 10 |  |
| 4     | 10 |  |
| 5     | 10 |  |
| Total | 50 |  |

- Complete all questions.
- You may use a scientific, non-graphing calculator during this examination. Other electronic devices are not allowed, and should be turned off for the duration of the exam.
- If you use a trial-and-error or guess-and-check method when an algebraic method is available, you will not receive full credit.
- You may use one hand-written 8.5 by 11 inch page of notes.
- Show all work for full credit.
- You have 50 minutes to complete the exam.

1. Find the angle between the vectors  $\langle 3, 4, -1 \rangle$  and  $\langle 5, 2, 8 \rangle$ .

2. Find the plane containing the line

$$x = 3 - t, y = 2 - \frac{1}{2}t, z = 6 + 2t$$

and the point  $(4, -5, 2)$ .

3. Where does the plane

$$3x - y + 5z = 12$$

intersect the line

$$x = 5t + 1, y = 4t + 2, z = 5t - 1?$$

4. Find the arc length of the curve

$$x = t^2, y = \frac{2}{3}t^3$$

for  $0 \leq t \leq 5$ .

5. Let  $C$  be the polar curve

$$r = \theta^2.$$

(a)  $C$  intersects the line  $y = x$  infinitely many times. Give the Cartesian coordinates of one point of intersection which is not the origin.

(b) Find the slope of the tangent line to  $C$  at the point you gave in (a).