Math 126 - Spring 2012
Exam 1
April 19, 2012

Name: ______________________________

Section: ______________________________

Student ID Number: ______________________________

PAGE 1	12	
PAGE 2	15	
PAGE 3	12	
PAGE 4	11	
Total	50	

- You are allowed to use a scientific calculator (**NO GRAPHING CALCULATORS**) and one **hand-written** 8.5 by 11 inch page of notes. Put your name on your sheet of notes and turn it in with the exam.
- Check that your exam contains all the problems listed above.
- Clearly put a box around your final answers and cross off any work that you don't want us to grade.
- Show your work. The correct answer with no supporting work may result in no credit. Guess and check methods are not sufficient, you must use appropriate methods from class.
- Unless otherwise indicated, your final answer should be given in exact form whenever possible and correct to two digits if given as a decimal.
- Cheating will not be tolerated. Keep your eyes on your exam!
- You have 50 minutes to complete the exam. Use your time effectively, spend less than 10 minutes on each page and make sure to leave plenty of time to look at every page. Leave nothing blank, show me what you know!

GOOD LUCK!

1. (a) (6 pts) Find parametric equations for the line of intersection of the planes $2x - y + 3z + 4 = 0$ and $-x + y - z = 0$.

(b) (6 pts) Find the equation of the plane that goes through the two points $P(2, -1, 0)$ and $Q(4, 0, 3)$ and is parallel to the line $x = 3t$, $y = 1 - t$, $z = 4 + t$.

2. Consider the vectors $\mathbf{u} = \langle 3, -2, 5\rangle$, $\mathbf{v} = \langle 2, -1, 0\rangle$.

(a) (4 pts) Find the vector obtained by projecting $\mathbf{u}$ onto $\mathbf{v}$.

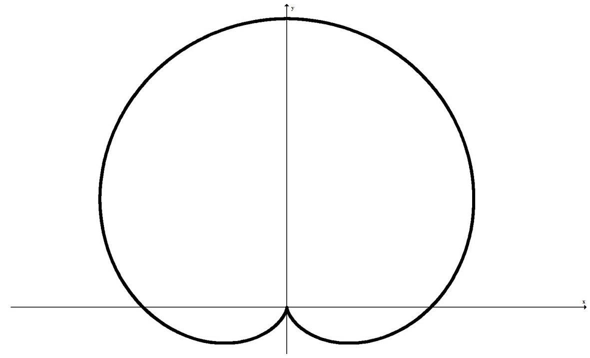
(b) (4 pts) Find the area of the triangle with corners $(0, 0, 0)$, $(3, -2, 5)$ and $(2, -1, 0)$.

3. (7 pts) Find the angle of intersection of the two curves:

$$\mathbf{r}_1(t) = \langle t, 2 - t, t^2 - 5t - 11\rangle \text{ and } \mathbf{r}_2(u) = \langle 5 - 2u, u - 4, u^3 + 4\rangle.$$

(Give your answer in degrees rounded to two digits after the decimal).

4. (7 pts) Find all (x, y) coordinates at which $r = \sin(\theta) + 1$ has a horizontal tangent.



5. (5 pts) You are observing Dr. Loveless (in hopes of surprising him with a water balloon). He is going for a hike and his location is given by the position function

$$\mathbf{r}(t) = \left\langle t\cos(t), t\sin(t), 3\sqrt{t^2+1}\right\rangle$$

for $t \geq 0$, where t is in seconds and distances are in feet. Eliminate the parameter then circle the name that best characterizes the surface over which Dr. Loveless is hiking.

Circle the name that is most appropriate for this surface:

CONE	SPHERE
ELLIPSOID	PARABOLIC CYLINDER
ELLIPTICAL CYLINDER	HYPERBOLIC CYLINDER
HYPERBOLOID OF ONE SHEET	HYPERBOLOID OF TWO SHEETS
ELLIPTIC PARABOLOID	HYPERBOLIC PARABOLOID
NONE OF THESE	

6. Consider the curve given by the position function $\mathbf{r}(t) = \langle \ln(t), t^2 + 5, 3t \rangle$ for $t > 0$.

(a) (6 pts) Find the (x, y, z) point where the tangent line through the curve at $(0, 6, 3)$ would intersect the xy-plane.

(b) (5 pts) Find all (x, y, z) points on the curve at which the tangent line would be orthogonal to the plane $x + 8y + 6z = 7$.