Math 126 - Winter 2015
Exam 1
February 3, 2015

Name: ______________________________

Section: ______________________________

Student ID Number: ______________________________

PAGE 1	12	
PAGE 2	14	
PAGE 3	9	
PAGE 4	15	
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.
- Leave your answer in exact form. Simplify standard trig, inverse trig, natural logarithm, and root values. For example, don't leave your answer in the form $\sqrt{4}$ or $\cos(\pi/4)$ instead write $\sqrt{4} = 2$ and $\cos(\pi/4) = \sqrt{2}/2$. But otherwise, you do not have to simplify.
- Cheating will not be tolerated. We report all suspicions of cheating to the misconduct board. If you are found guilty of cheating by the misconduct board, then you will get a zero on the exam (and likely face other academic penalties). 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. (12 points)

(a) (4 pts) Find the equation of the plane that contains the point $(7, -5, 6)$ and is orthogonal to the line given by the symmetric equations $\dfrac{x-1}{2} = \dfrac{y-2}{3} = -z$.

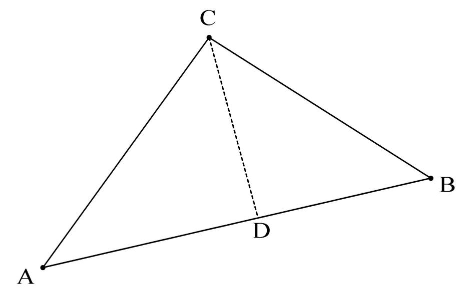
(b) Consider the surface $z = x^2 - 3y^2$.

i. (3 pts) Name the surface. That is, state whether this equation gives a cone, an ellipsoid, a parabolic cylinder, or one of the other named shapes that we discussed in section 12.6 (if you can't think of the name, describe all the traces for partial credit).

ii. (5 pts) Find **all** (x, y, z) intersection points of the line through $(0, 0, 9)$ and $(2, 1, 9)$ with the surface $z = x^2 - 3y^2$. (Hint: Start by finding equations for the line).

2. (14 pts) Consider the triangle shown. The coordinates for C are (4,3,1).
You are given $\overrightarrow{BA} = \langle -2, -1, 3 \rangle$ and $\overrightarrow{BC} = \langle -1, 1, 4 \rangle$.
The dotted line CD is perpendicular to BA.
Answer the following questions (Leave your answer in exact form, you do not have to simplify).

(a) (5 pts) Find the equation of the plane that contains the points A, B, and C.



(b) (3 pts) Find the area of the triangle ABC.

(c) (3 pts) Find the coordinates for the point A.

(d) (3 pts) Find the distance from B to D.

3. (9 pts) Consider the polar curve $r = 2\sin(\theta) + 3$. (Simplify your answers in this problem!)

(a) (3 pts) Find the (x, y) coordinates of the point that corresponds to $\theta = \pi/6$ on this curve.

(b) (6 pts) The curve has one negative x-intercept.
Find the equation for the tangent line at the negative x-intercept.
(Put your final answer in the form $y = mx + b$.)

4. (15 points) A curve is given by the vector function $\mathbf{r}(t) = \left\langle 2t, 5, t^2 - t \right\rangle$.

(a) (5 pts) There is one point on the curve at which the tangent line is parallel to the xy-plane. Give the equation for the tangent line at this point.

(b) (5 pts) Find the curvature of the curve at the point $(-4, 5, 6)$. (Leave in exact form).

(c) (5 pts) A second curve is given by the vector function $\mathbf{h}(u) = \left\langle 7 + u, 2u + 11, u^2 + u - 4 \right\rangle$.
The two curves have one point of intersection.
Find the angle of intersection, θ. (Round to the nearest degree).