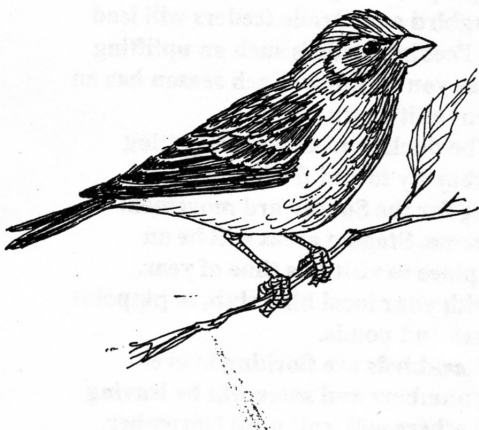


Name: _____
Section: _____
TA: _____

Math 20C
Exam 1 A
October 21, 2011



Turn off and put away your cell phone.
You may use a calculator and one sheet of notes on the exam.
Read each question carefully, and answer each question completely.
Show all of your work; no credit will be given for unsupported answers.
Write your solutions clearly and legibly; no credit will be given for illegible solutions.
If any question is not clear, ask for clarification.

#	Points	Score
1	9	
2	9	
3	12	
4	10	
Σ	40	

1. (9) Suppose

$$\mathbf{u} = \langle 4, 1, -2 \rangle, \quad \mathbf{v} = \langle -3, 6, 1 \rangle, \quad \mathbf{w} = \langle -2, -1, 3 \rangle$$

Compute

(a) $\mathbf{u} \cdot \mathbf{w}$

(b) $\mathbf{w} \times \mathbf{v}$

(c) $\|\mathbf{w}\|$

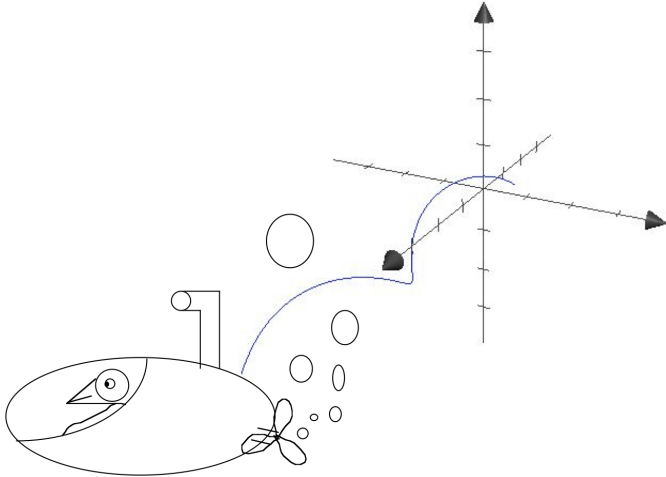
2. (9)

Consider the path

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

Find a parametrization of the line that is tangent to $\mathbf{r}(t)$ when $t = 1$.

3. (12) Suppose a bird is traveling in a submarine along the path $\mathbf{r}(t) = \langle 3t - 1, \cos 2t, \sin 2t \rangle$.



- (a) Compute the length of its path from $t = 0$ to $t = 5$.
- (b) Compute the velocity at time t .
- (c) Compute the acceleration at time t .
- (d) At time $t = \pi/2$, is the submarine speeding up, slowing down or traveling at a constant speed? Explain your answer.

4. (10)

(a) Determine the equation of the plane that passes through the points

$$(2, -1, 4), (1, -1, 3), (1, 3, -2).$$

(b) Find the point of intersection of the plane

$$2x - 3y + z = 5$$

and the line

$$\mathbf{r}(t) = \langle 3t + 2, 1, -7t \rangle.$$