Math 261 Exam 1, Spring 2003

Show all work!	Name:	Score	
1.	Given the two points P(4,-1,3) and Q(0,-2,4), find:	1	
	a) The distance from P to Q. b) A unit vector in the direction $\overrightarrow{PQ}$.	2	
		3	
		4	
		5	
	Ans:_____. Ans:_____.	6	
2.	Let $\mathbf{a}=\langle 1,2,-1\rangle$ and $\mathbf{b}=\langle 5,-2,3\rangle$. Find	7	
	a) The scalar projection of $\mathbf{b}$ onto $\mathbf{a}$. b) The angle between $\mathbf{a}$ and $\mathbf{b}$.	8	
		9	
		10	
	Ans:_____. Ans:_____.	Tot	
3.	Find the equation of the line containing:		
	a) The points $P(2,3,1)$ and $Q(4,6,-1)$. b) The point $P(2,-1-4)$ and $\perp$ to $3x+2y-z=9$		
	Ans:_____. Ans:_____.		
4.	Given the three points $P(2,2,5)$, $Q(-2,0,6)$ and $R(-3,1,5)$ Find:		
	a) The area of $\triangle PQR$ b) The equation of the plane through P, Q and R.		
	Ans:_____. Ans:_____.		
5.	A plane $\mathcal{P}$ contains the line $\mathbf{r}(t)=\langle 2-3t,2t,1+t\rangle$ and the point $Q(2,1,1)$. Find:		
	a) A normal $\mathbf{N}$ to the plane $\mathcal{P}$. b) The equation of the plane.		
	Ans:_____. Ans:_____.		
	Extra Space		

Part II.	Name:

5. Identify the names of the graphs described by the following equations in R^3.

a) $x^2 - 4y^2 - 9z^2 = 0$ Ans:_____.

b) $4y - 6z^2 + x^2 = 8$ Ans:_____.

c) $9x^2 + y^2 - z^2 = 16$ Ans:_____.

d) $y^2 + z^2 = 16$ Ans:_____.

e) $\mathbf{r}(t) = \langle \sinh 2t, \cosh 3t, 4 \rangle$ Ans:_____.

f) $\mathbf{r}(t) = \langle t, 4 - t, 4t + 2 \rangle$ Ans:_____.

7. Given the vector function $\mathbf{r}(t) = \langle e^{2t}, e^{-2t}, te^{2t} \rangle$, find

a) The velocity vector.

Ans:_____.

b) $\mathbf{T}(0)$.

Ans:_____.

8. Find the length of the curve: $\mathbf{r}(t) = t^2\,\mathbf{i} + 2t\,\mathbf{j} + \ln t\,\mathbf{k}$, with $0 \le t \le e$.

Ans:_____

9. Let $\mathbf{r}(t) = \langle t^2, 2t, \ln t \rangle$.

a) Find the speed at $t = 1$.

Ans:_____.

b) Find the unit tangent $\mathbf{T}$ at $t = 1$.

Ans:_____.

10. c) The curvature κ at $t = 1$.

Ans:_____.

d) Find the centripetal acceleration a_N at $t = 1$.

Ans:_____.

Extra Space