Math 261 Exam 1, Spring 2004

Show all work!	Name:	Score	
1.	If the points P(3,-2,1) and Q(1,4,2) are endpoints of a diameter of a sphere, find:	1	
	a) The radius of the sphere.	2	
		3	
		4	
		5	
	Ans:_____.	6	
2.	Given the force $\mathbf{F}=\langle -4,1,3\rangle$ and the displacement $\mathbf{r}=\langle 2,-2,3\rangle$. Find	7	
	a) The scalar projection of $\mathbf{F}$ onto $\mathbf{r}$.	8	
		9	
		10	
	Ans:_____.	Tot	
3.	Find the equation of the line through the point $P(5,-3,6)$ and :		
	a) Parallel to $\mathbf{r}(t)=\langle 7+t,-4-2t,2+3t\rangle$.		
	Ans:_____.		
	b) Perpendicular to $4x-5y+2z=12$		
	Ans:_____.		
4.	Given the points $P(2,1,0)$, $Q(3,0,-1)$, and $R(0,1,2)$, find:		
	a) The area of $\triangle PQR$.		
	Ans:_____.		
	b) The equation of the plane through P, Q and R .		
	Ans:_____.		
5.	A plane $\mathcal{P}$ contains the point $P(4,6,1)$, and the line $\mathbf{r}(t)=\langle 1-5t,6-t,3+2t\rangle$. Find:		
	a) A normal $\mathbf{N}$ to the plane $\mathcal{P}$.		
	Ans:_____.		
	b) The equation of the plane.		
	Ans:_____.		
	Extra Space		

Part II.	Name:

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

a) $4x^2 - 4y^2 = z + 1$ Ans:_____.

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

c) $5x^2 - 8y^2 - z^2 = 10$ Ans:_____.

d) $7x = y^2 + z^2$ Ans:_____.

e) $\mathbf{r}(t) = \langle 5t, \cos 3t, \sin 4t, \rangle$ Ans:_____.

f) $\mathbf{r}(t) = \langle 8, 4t, 2t^2 \rangle$ Ans:_____.

7. A particle moves with an acceleration $\mathbf{A}(t) = \langle t, t^2, t^3 \rangle$, with $\mathbf{v}(0) = \mathbf{0}$ and $\mathbf{r}(0) = \mathbf{0}$. Find

a) The velocity $\mathbf{v}(t)$.

Ans:_____.

b) The displacement $\mathbf{r}(t)$.

Ans:_____.

8. Given the curve the curve: $\mathbf{r}(t) = \ln(\sec t)\,\mathbf{i} + t\,\mathbf{j} + 5\,\mathbf{k}$, with $0 \le t \le \pi/4$.

a) Find the speed at $t = \pi/4$.

Ans:_____

b) Find the length of the curve.

Ans:_____

9. Let $\mathbf{r}(t) = \langle 4t, 2\cos 3t, 2\sin 3t \rangle$.

a) Find the velocity.

Ans:_____.

b) Find the unit Tangent $\mathbf{T}$.

Ans:_____.

10.

c) The curvature.

Ans:_____.

d) Find the centripetal acceleration a_N.

Ans:_____.

Extra Space