

Math 2633
Summer 2004 – Practice Test 2

NAME _____

1. Find the arclength of the curve $r(t) = \langle \sin t, 5t, \cos t \rangle$ from $t = 0$ to $t = 5$.
2. Find the unit tangent vector to $r(t) = \langle -\sin(2t), t^2 - 1, \cos^2 t \rangle$ at the point $\left(0, \frac{9\pi^2 - 4}{4}, 0\right)$.
3. Determine whether $r(t) = \langle e^{-t}, \frac{1}{t}, t \rangle$ is smooth.
4. Find the following integral: $\int_0^\pi \langle 3^{-t}, \cos(3t), t^2 \rangle$.
5. Find a vector function that represents the curve of intersection between $y^2 = z + x^2$ and $x = 2 - y^2$.
6. Find the curvature of the curve $r(t) = \langle 2t + 3, 5 - t^2, t \rangle$.
7.
 - a. Write the following equation in cylindrical coordinates and spherical coordinates:
 $x^2 + y^2 + 2z^2 = 4$.
 - b. Identify the surface whose equation is $\theta = 0$.
 - c. The cylindrical coordinates of a point are $\left(-3, \frac{\pi}{4}, 0\right)$. Find the rectangular and spherical coordinates of the point.
8. Find the vectors T, N and B of $r(t) = \langle 3t^2, t^2 + 2, t \rangle$ at the point (3, 3, 1).