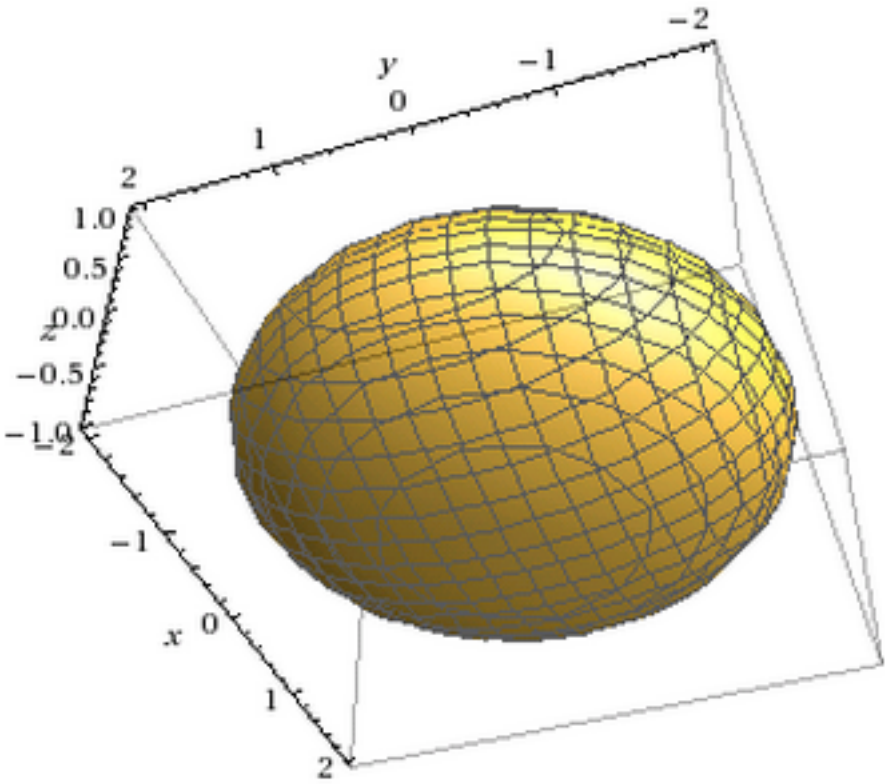
MATH 2401 QUIZ 2

SECTION B MW 8:05

Name:

Problem 1. Please sketch $x^2 + y^2 + 4z^2 = 4$.



Problem 2. Given position vector $\vec{r}(t) = (\ln(t^2+1))\,\vec{i} + \tan^{-1}\vec{j} + \sqrt{t^2+1}\vec{k}$ find the velocity and acceleration vectors, and the speed and direction of movement at $t = 0$.

$\vec{v}(t) = \frac{2t}{t^2+1}\vec{i} + \frac{1}{t^2+1}\vec{j} + \frac{t}{(t^2+1)^{\frac{1}{2}}}\vec{k} \rightarrow$ at $t = 0,\ \vec{v}(0) = \vec{j}$

$\vec{a}(t) = \frac{2(1-t^2)}{(t^2+1)^2}\vec{i} + \frac{-2t}{(t^2+1)^2}\vec{j} + \frac{1}{(t^2+1)^{\frac{3}{2}}}\vec{k} \rightarrow$ at $t = 0, \vec{a}(0) = 2\vec{i} + \vec{k}$

Problem 3. Evaluate the integral

$$\int_1^{\ln 3} \left(te^t\vec{i} + e^t\vec{j} + \ln t\vec{k}\right) dt$$

You will need to do parts on 2 of the 3 of these integrals.

$(t-1)e^t\vec{i} + e^t\vec{j} + t(\ln t - 1)\vec{k}\Big|_1^{\ln 3}$

Then plug in the values

$((\ln 3 - 1) * 3) - (0)\vec{i} + (3-e)\vec{j} + ((\ln 3)(\ln\ln 3 - 1)) - (-1)\vec{k}$

$(3\ln 3 - 3)\vec{1} + (3-e)\vec{j} + ((\ln 3)(\ln\ln 3 - 1)) + 1)\vec{k}$