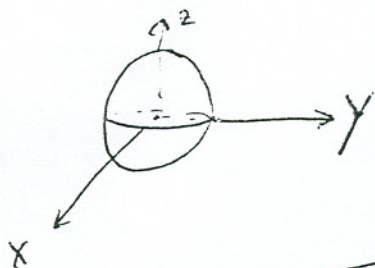


PRINT Your Name: _____

There are 8 problems on 4 pages. Problems 1-4 are worth 13 points each. Each of the other problems is worth 12 points. SHOW your work. **CIRCLE** your answer. **NO CALCULATORS!**

1. Graph and describe the graph of $x^2 + y^2 + z^2 = 1$ in 3-space.

This is the sphere with radius 1 and center at the origin.



2. (There is no partial credit for this problem. Make sure your answer is correct.) Find the equations of the line through $(1, 4, 7)$ and $(2, 5, 11)$.

$P =$ $Q =$

$$\vec{PQ} = \vec{i} + \vec{j} + 4\vec{k}$$

$$\begin{cases} x = 1 + t \\ y = 4 + t \\ z = 7 + 4t \end{cases}$$

check: at $t=0$ the line hits $(1, 4, 7)$
at $t=1$ the line hits $(2, 5, 11)$