291:01 **A curve problem** 2/10/2003

The circular cylinder $x^2 + y^2 = 1$ and the parabolic cylinder $z = y^2$ intersect in a space curve, C, in $\mathbb{R}^3$. Do the following "by hand" individually. Give me your work on Wednesday, February 12. You do *not* need to include explanations of your computations, but do include enough details so that I can understand how you got your answers.

1. Make a rough sketch of C.

2. The point $p = \left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}, \frac{1}{2}\right)$ is on the curve, C. Find the curvature, κ, the torsion, τ, and the Frenet frame, $\{\mathbf{T}, \mathbf{N}, \mathbf{B}\}$, for C at p.

3. Draw the Frenet frame on your sketch of C. Put the "tails" of the three vectors at p.

Comment I *don't* know the answers to the second question. I'll be happy to give hints electronically or otherwise for the processes needed, which I do know (!). Also, if anyone who has done the problem sends me their answers, I will post them on a link for the course webpage (probably on "Work to be handed in") so that students may check their answers.

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