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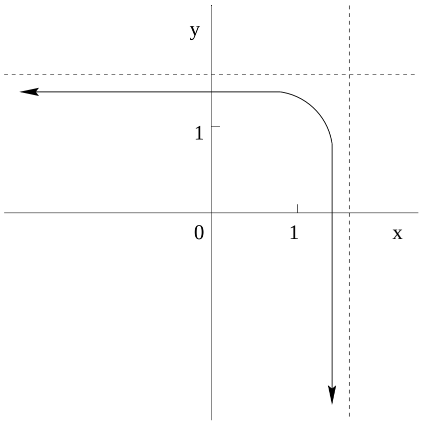
Workshop Problems

2/5/97

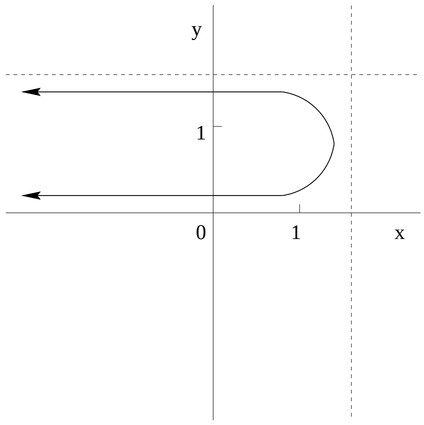
We'll tell you one problem whose solution should be written up for next week's meeting. Your written solution should be of high-quality, with complete explanations given including any useful diagrams or equations. While you are encouraged to discuss the problems with other students and with the instructors, your written work must be your own explanation of the problem.

1. Is the point (1,2,3) on a tangent line of the twisted cubic $\mathbf{c}(t) = \langle t, t^2, t^3 \rangle$?

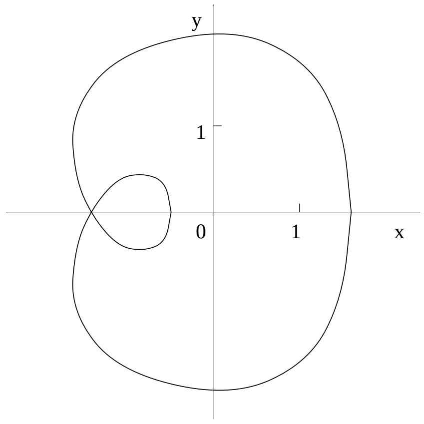
2. a) Suppose each of the following curves is parameterized "by arc length": that is, walk along them at unit speed. Make a reasonable sketch of the *curvature* of each curve as a function of the parameter. Discuss why your sketches are reasonable.



Curve I

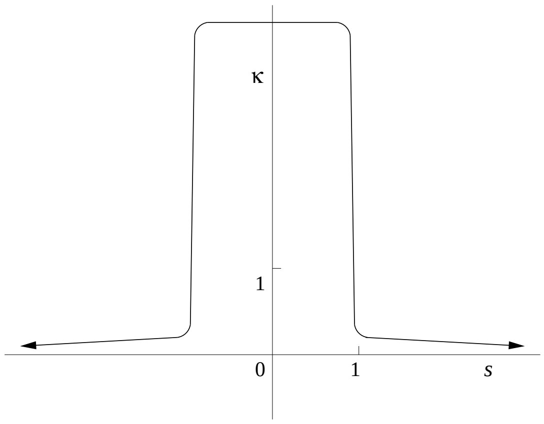


Curve II

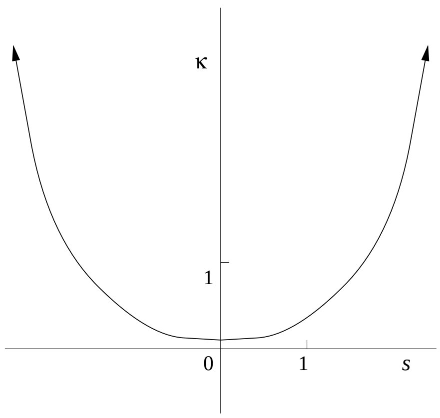


Curve III

b) The following is a sketch of the *curvature* of several curves. In each case, sketch a curve parameterized by arc length (so you travel along it at unit speed) whose curvature may reasonably have the graphs indicated. Discuss why your sketches are reasonable.



Curvature of curve A



Curvature of curve B