This assignment is in two parts. The first part is due at the start of class on Day 7. It will not be collected, but you are expected to complete these exercises, just to practice basic skills. If you feel that you need more practice, then do more problems or talk to me.

13.3 Exercises 6, 8, 12, 14, 17, 29

13.4 Exercises 10, 21, 36

The second part is due on paper at the start of class on Day 8. Submit polished solutions, including all necessary work and no unnecessary work, in the order assigned.

A. 13.4 Exercise 42.

A car racing track is in the shape of an oval: two semicircular curves joined by two straight, parallel line segments. The straight segments are 600 meters long, while the semicircles have radius 200 meters, for a total length of a little over 2400 meters.

B. Parametrize one of the semicircles using a 2D vector-valued function. Your parametrization should have speed v, where v is an unknown constant (the speed of a car traveling around the curve).

C. In the curved segments, the track is banked at an angle of θ relative to horizontal, to help cars take the curve at high speed. Compute the magnitude of the car's acceleration perpendicular to the track and parallel to the track, in terms of v and θ.

D. In this part, assume no banking ($\theta = 0$). When the car passes from the curved portion of the track to the straight portion of the track, its position is continuous with respect to time. Is its velocity continuous? Is its acceleration continuous?