

Calculus I - Project 2
Winter 2022

This project is due at the beginning of class on Friday, Week 6. It may be turned in in person, or uploaded into Moodle. It should be written in full sentences, and typed, although please note that equations and math symbols may be written in by hand. While it is acceptable to work together in thinking about this project, each student is expected to write up results independently. More information about what is expected from write ups for all our class projects is found in the Guidelines Rubric.

So! A new road is going to be paved in the woods by my cabin, but before that can be done, the Michigan Department of Transportation (MDOT) has been tasked by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) with making sure that local wildlife will not be unduly adversely affected by it. Now they are tasking you. The principal concern is how it is going to affect the deer. You see, the deer have a favorite clearing where they often forage for food (it helps that I plant kale there!), and EGLE wonders if the road is going to disturb that.

The proposed road can be modeled with the equation $f(x) = x^2 - x$, north being in the direction of the positive y axis, and with the clearing located at $(3, 1)$ in this model. Will cars travelling along the road catch the deer in the proverbial headlights? If so, where on the road will the cars be when that happens? Will the cars be coming from the west (ie, traveling towards positive x values) or from the east (traveling towards negative x values)?

MDOT is requesting of you a report on this matter so that they can allay EGLE's concerns or begin the task of remodeling the road.