

## George the Slug Math 206 Group Project

George is a slug. I don't mean that George sits around all day watching football and drinking beer. I mean that George is a slimy snail-like creature. George comes out at night and eats Lady Greene's favorite plants, her beloved begonias, located in the estate backyard. Of course Lord Greene never hears the end of this from Lady Greene (as if George is his pet or something), so he is out to get George. As CEO of CompuCalc I've signed a Memorandum of Agreement to assist Lord Greene in tracking George. I suppose I'd prefer to just go out and step on him myself, but that's not our client's desire. Lord Greene's gardeners have been observing George for some time now and have noticed that his nighttime movements are rather predictable in the following sense. If we represent the yard in the usual manner in terms of a coordinate plane, with the origin being the center of Lord Greene's backyard, then when George is at the point  $r$  ft from the origin, at an angle  $\theta$ , determined in a counterclockwise manner from the ray pointing due east of the origin (see sketch), then he always moves in the direction of the vector determined by  $r$  and  $\theta + 91^\circ$  (again, see sketch), with a speed  $r^{1.1}$  ft/min. Maybe the begonias have some strange effect on George because he only behaves this way after he finishes easting the begonias, and he appears to behave in this manner for each  $r$  and  $\theta$ , no matter where he is in the yard.

It is Lord Greene's request that we place some of his specially engineered tracking dust in George's path so that after George passes over it, his path will show up under special night-lights. Basically it will leave his footprints for the 'great hunter' Lord Greene to follow. This tracking dust is very costly and hence Lord Greene has allotted us only a very small amount, enough to cover  $1/16$  square inch of ground. It is my intention to place it in the shape of a square, .25in by .25in, somewhere in Lord Greene's yard, hopefully in George's path. I just need to figure out where to place the dust. Obviously Lord Greene does not wish us to invade his privacy and sit out there in his yard watching George's movements. However, I have made arrangements with his staff to allow me access to the yard for 5 minutes at 5:00 PM, well before George makes his usual appearance at midnight. I have also been able to ascertain that the begonias are located at the spot 30 ft east and 20 ft north of the center of the yard. Unfortunately, the estate gardeners have informed me that we cannot simply place the dust around the begonias; Lady Greene does not allow any chemicals near her beloved plants. I think our best plan of attack is to predict George's position 5 minutes after he has traveled by the begonias.

Please write a report to me, Dr. Anderson, CEO of CompuCalc, revealing your findings. Try to keep the report to 1-2 typewritten pages (except for graphics of course) and make sure I am convinced of your findings. Please follow the usual report requirements, including for example a clear and concise explanation of strategy and findings, and the rationale justifying the same. Lord and Lady Greene and I look forward to your findings. As a bonus, it would be nice to figure out where George would be later, say 1 hour later, just in case we need to place him farther from the begonias.

