

Rates

Directions: For this exploration you will be scored on the attached rubric. You will choose one of the following two tasks (both labeled Level D) to solve. Complete work is expected on all parts of the task. This means you need to show your work, explain your thinking, verify your answers for reasonableness and record your findings in a way that allows you to recreate your thinking. Zero credit will be given for unsupported answers. You will lose points for unorganized, messy or incomplete work. All work must be done on a separate sheet of paper; do not try to squeeze your work and answers in the small spaces on this page. The rubric page attached will serve as the cover page to your exploration. In addition to completing the task you will write a paragraph using complete sentences explaining what about the task you choose appealed to you most. Please include the following in your response: did you choose the task that was easier for you or the task that challenged you most, how much time did it take you, did you try multiple strategies before coming up with a solution, etc.

Level D:

You are a highway patrol officer, seated on a motorcycle, on a curvy section of Highway 1. The posted speed limit is 45 miles per hour (mph) on this stretch of highway. You are monitoring traffic with a radar gun. The first exit is 3.6 miles up the road. Your radar picks up a speeding car averaging 68 mph. When you try to start your motorcycle to follow the car, it won't start. You try again and again, and soon you fear that you won't be able to catch the speeding car before it can turn off the highway. Finally, your motorcycle starts and you begin your pursuit 30 seconds after the speeding car has passed you on the roadside.

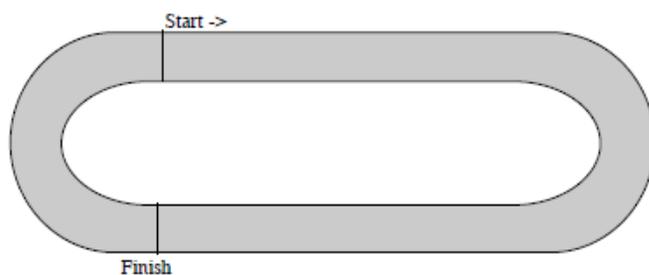
How fast do you need to go to catch up to the speeding car? What is your average speed in pursuit? Illustrate the speed of the speeding car as well as your own motorcycle during this pursuit.

Is your own speed reasonable and safe? Explain why this is or is not a good location at which to monitor traffic.

Rates

Level D

You are an Olympic runner. You have just qualified to be in the finals of the 1,500-meter race. The track is 400 meters in an oval shape. The race is three and three-fourth laps around the track.



The favorite to win the race is a Kenyan, who holds the current best time, which is 3 minutes 29.4 seconds. The Kenyan runs a very steady race. Each of the Kenyan's lap times (400 meters) are within a second of each other.

You run a completely different type of race. You have a very strong kick, which means you usually lag behind for the first three laps to save energy and then when the leader has 300 meters to go you pour it on to win at the tape. You like to save energy in the first three laps, but you don't want to be more than 50 meters behind when you start your kick to the finish line.

Determine your strategy to win this race. What is the average speed you need to run the first part of the race? What is the average speed you need to run during your kick to win the race? How might your race change if the Kenyan runs two seconds faster?