Mathematics 1110H (Section B) – Calculus I: Limits, Derivatives, and Integrals

Quiz #8
Synchronized Drag Racing?

Due* just before midnight on Wednesday, 15 November.

REMINDER. While you are allowed to work together and look things up when doing the quizzes and assignments, your submission should be written up entirely by yourself, giving credit to any collaborators or sources that you ended up actually using. *Please show all your steps and simplify your answers as far as practical.*

Cars A, B, and C race away from the origin at the same time. Car A drives along the positive y-axis, car B drives along the positive x-axis, and car C drives away from the origin into the first quadrant, somehow making the origin and the positions of the three cars the corners of a rectangle at every moment. Note that the cars do not necessarily moves at constant speeds in what follows except that we know that the area of the rectangle is always increasing at a constant rate of 10 km^2/h.

Suppose that at a particular instant car A is 10 km from the origin and is moving at a speed of 1 km/h away from the origin, while car B is 20 km from the origin at this instant.

1. How is car B moving at this instant? *[2.5]*

2. How is the perimeter of the rectangle formed by the origin and the three cars changing at this instant? *[1]*

3. How is car C moving at this instant? *[1.5]*