

Mathematics 1100Y – Calculus I: Calculus of one variable

TRENT UNIVERSITY, Summer 2012

Assignment #4

A really hairy problem!

Due on Wednesday, 13 June, 2012.

A hair 2π cm long lies fully stretched out on the surface of a spherical balloon while it is being inflated. The hair does not expand or shrink during this process.

1. At the instant that the radius of the balloon is 4 cm, the ends of the hair are moving away from each other (in terms of straight-line distance) at a rate of 1 cm/s. How is the radius of the balloon changing at this instant? [5]
2. At the same instant, how quickly is the midpoint of the hair approaching the straight line joining the two ends? [5]