

Mathematics 1110H – Calculus I: Limits, derivatives, and Integrals

TRENT UNIVERSITY, Summer 2018

Assignment #6

Static cling meets calculus?

Due at the exam on Thursday, 14 June.

Static cling keeps a hair 2π cm long stuck to the surface of a spherical balloon while it is being inflated, not necessarily at a constant rate. The balloon remains spherical at all times, and the hair, which doesn't stretch or shrink, remains as straight as possible on its surface. [This means that it lies on a "great circle" of the sphere that has the same radius and centre as the sphere. You can think of it as the equator of the sphere if you like.]

1. How is the radius of the balloon changing when it is 4 cm, if the ends of the hair are moving apart at 1 cm/s at that instant? [10]