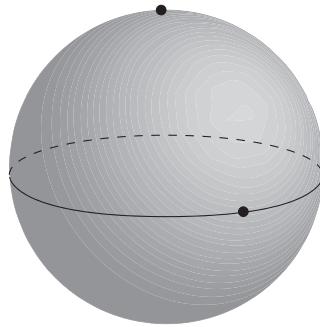# Dos Moscas[1]

Details

Two flies are sitting on a spherical balloon while it is being inflated at a constant rate. Assume that air is being pumped into the balloon at a rate of 5 cubic centimeters per second. Also assume that there is no air in the balloon to begin with. Finally, assume that one fly is sitting at the north pole while the other sits at the equator.

A. Draw a picture complete with labels.

B. Write an equation for the distance between the flies as a function of time.

C. Use your result above to help you determine the following.

(i) How fast are the flies parting company after 3 seconds?

(ii) How fast after 1/10 second?

(iii) How fast after 1/100 second?

(iv) How fast are the flies parting company initially?

D. Note that there is more than one way to measure distance in this problem. One is the Euclidean version (the straight line approach you probably used above), while another measures across the surface. Repeat steps (A), (B) and (C) above so that you have two complete sets of results for the two different distance models.

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[1]Reproduced from Cohen, Gaughan, et al. *Student Research Projects in Calculus*;MAA: Washington, D.C.,1991