1 Workshop 1 (19 Apr Fri)

2014/II/3

1. In a training exercise, athletes run from a starting point to an from a series o points, A_1, A_2, A_3..., increasingly far away in a straight line. In the exercise, athletes start at O and run stage 1 from O to A_1 and back to O, then stage 2 from O to A_2 and back to O, and so on.

(ai) In version 1 of the exercise, the distance between adjacent points are all 4m. Find the distance run by an athlete who completes the first IO stages of Version 1 of the exercise.

[2m]

(aii) Write down an expression for the distance run by an athlete who completes n stages of Version 1. Hence find the least number of stages that the athlete needs to complete to run at least 5 km.

[4m]

(b) In Version 2 of the exercise, the distances between the points are such that $OA_1 = 4$m, $A_1A_2 = 8$, and $A_nA_{n+1} = 2A_{n-1}A_n$. Write down an expression for the distance run by an athlete who completes n stages of Version 2. Hence find the distance from O, and the direction of travel, of the athlete after he has run exactly 10 km using Version 2.

[5m]