(a) Prove that $\cos 2 A=\cos ^{2} A-\sin ^{2} A$.

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(b) The diagram shows part of the circular end of a running track with three running lanes shown. The centre of each of the circular boundaries of the lanes is at $O$.

Kate runs in the middle of lane 1 , from $A$ to $B$ as shown.

Helen runs in the middle of lane 2, from $C$ to $D$ as shown.

Helen runs 3 m further than Kate.
$|\angle A O B|=|\angle C O D|=\theta$ radians.
If each lane is 1.2 m wide, find $\theta$.

$\qquad$

