

Track Design

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Length of inner track = 400m

Length of ^{both of} straight parts of inner track = 170m

\therefore Length of both of the semi-circular parts of the inner track = ~~400~~ $400 - 170 = 230$ m

Length of one of the each of the semi circular parts is 115 m

So radius ^{of inner circle} = $\frac{115}{\pi}$

~~Radius of 2nd track~~ $\times \in \mathbb{Z}$
 \therefore ~~length~~ ^{Radius of 2nd track} = ~~Radius of 1st~~ + x
 $= \frac{115}{\pi} + x$

\therefore Radius of i^{th} track = $\frac{115}{\pi} + x(2i-1)$

Length of 2nd track = $400 + 2\pi x$

\therefore Length of i^{th} track = $400 + 2(i-1)\pi x$

For the 200m race a staggered start is required.

In this case the distance between any 2 neighbouring runners is $\pi x (= \Delta)$

When $x = 1.25$ m, $\Delta \approx 3.925$ m

For the 400m race $\Delta = 2\pi x \approx 7.85$ m.