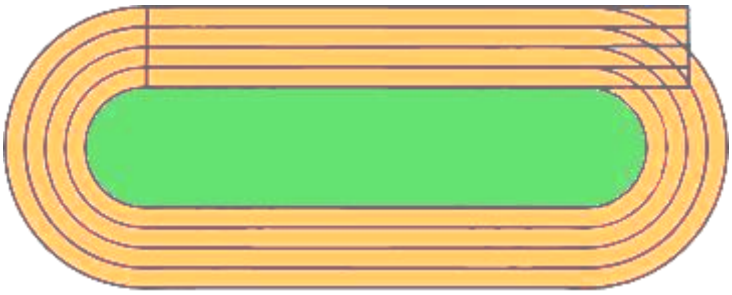
Track Design

Imagine you are building a new Olympic stadium and you are responsible for designing and marking out the running track. The track needs to fulfil the following specifications:

- The distance around the inside edge of the inner lane should be 400m.
- There should be 8 lanes.
- Each lane should be 1.25m wide.
- The track should consist of two straight sections joined by two semi-circular sections.
- The straight sections should each be 85m in length (a straight section is extended over the curve for the 100m race, as shown below).



Can you work out the radius of the curved sections in order to produce an accurate scale drawing?

For the 200m race, runners start on the curved section at the right of the diagram and run anticlockwise to the finish line at the top left.
As the outer lanes are longer than the inner lanes, a staggered start is needed so that at the finish line all runners have run the same distance.

Can you work out where each runner should start so that they all run 200m in total?

For the 400m race, the runner in lane 1 does one complete lap of the track, so the start line is the same as the finish line. The runners in lanes 2 to 8 again have a staggered start.

Can you work out where each runner should start so that they all run 400m in total?