Calculation of Turn Radii for the Car

Turn #1

From the graphs, angular velocity is 5.432 °/s and centripetal acceleration is 1.264 m/s^2.

Angular velocity = ω = 5.432 °/s x $2\pi/360$ rad/° = 0.0948 rad/s.

Since $a_c = \omega^2 r$, then $r = a_c/\omega^2$ = 1.264 m/s^2 / $(0.0948/s)^2$ = 141 m.

Turn #2

From the graphs, angular velocity is 5.146 °/s and centripetal acceleration is 1.093 m/s^2.

Angular velocity = ω = 5.146 °/s x $2\pi/360$ rad/° = 0.0898 rad/s.

Since $a_c = \omega^2 r$, then $r = a_c/\omega^2$ = 1.093 m/s^2 / $(0.0898/s)^2$ = 135.5 m.