A car travelling 19.4 m/s passes a police car at rest. As it passes, the police car starts up, accelerating with a magnitude of 3.2 m/s. Maintaining that acceleration, how long will it take the police car to catch up with the speeding motorist?

Suppose at initial moment police car located at point $x = 0$. Then its coordinate equals:

$S_p = \frac{at^2}{2}$

a – acceleration of police car

t – time

And coordinate of car equals:

$S_c = vt$

v – speed of car

Police car catch the car then $S_p = S_c$:

$\frac{at^2}{2} = vt$

$\frac{at}{2} = v$ => $t = \frac{2v}{a}$

$t = 2 * \frac{19.4}{3.2} = 12\frac{1}{8} = 12.1$ s

Answer: 12.1 seconds.