A car travelling at 60 km/h overtakes another car travelling at 42 km/h . Assuming each car to be 5 .0 m long. Find the time taken during the overtake.

Relative velocity of cars equals:

$v_{12} = v_1 - v_2$ – because one overtakes another

where v_1, v_2 - velocities of first and second cars.

Their total length equals:

$L = 2l$,

where l – length of one car (their lengths equal)

Therefore, time taken during the overtake equals:

$t = \frac{L}{v_{12}} = \frac{2l}{v_1 - v_2} = \frac{10m}{(60-42)\frac{km}{h}} = \frac{10m}{5\frac{m}{s}} = 2\ s$

Answer: $t = 2\ seconds$