

11 A car starts from rest at a set of traffic lights and moves along a straight road with constant acceleration 4 m s^{-2} . A motorcycle, travelling parallel to the car with constant speed 16 m s^{-1} , passes the same traffic lights exactly 1.5 seconds after the car starts to move. The time after the car starts to move is denoted by t seconds.

- (a)** Determine the two values of t at which the car and motorcycle are the same distance from the traffic lights. **[6]**

These two values of t are denoted by t_1 and t_2 , where $t_1 < t_2$.

- (b)** Describe the relative positions of the car and the motorcycle when $t_1 < t < t_2$. **[1]**

- (c)** Determine the maximum distance between the car and the motorcycle when $t_1 < t < t_2$. **[3]**